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1. CHASSIS

1.1 GENERAL

Chassis materials

Type	Chassis type	Material
FT	Side member thickness 6 mm	KF 600 (1)
	Side member thickness 7 mm	KF 500 (1)
FTG	n/a	KF 500 (1)
FTP	n/a	KF 600 (1)
FTS	Side member height 260 mm	KF 500 (1)
	Side member height 310 mm	KF 375
FTT	RHD version: side member height 260 mm, side member thickness 7 mm	KF 500 (1)
	Other versions	KF 375
FA	n/a	KF 375
FAC	n/a	KF 375
FAD	Side member height 310 mm, side member thickness 6 mm	KF 600 (1)
	Other versions	KF 375
FAG	n/a	KF 375
FAL	n/a	KF 375
FAN	n/a	KF 375
FAR	n/a	KF 375
FAS	n/a	KF 375
FAT	RHD version: side member height 260 mm, side member thickness 7 mm	KF 500 (1)
	Side member height 310 mm, side member thickness 6 mm	KF 600 (1)
	Other versions	KF 375
FAX	n/a	KF 375

(1) KF 500 and KF 600 are "High Tensile Strength" types of steel.

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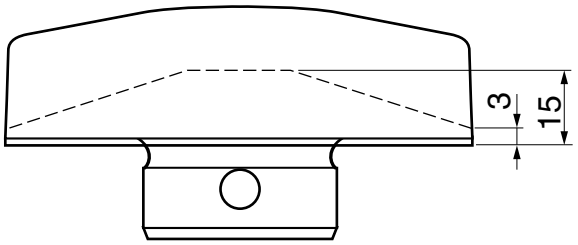
2. STABILISERS, TORQUE RODS AND LEAF SUSPENSION

2.1 GENERAL

Minimum dimensions of wearing plates
If one of the dimensions of the wearing plates, on which the spring assembly rests, is smaller than indicated by the dotted line in the opposite drawing, the wearing plates must be replaced.



W9 00 013

Alignment plate/tandem axle spring clearance
If applicable, the clearance between the alignment plate and the tandem axle is: 1.5 - 2.5 mm.

2.2 TIGHTENING TORQUES

The tightening torques stated in this section are different from the standard tightening torques stated in the overview of the standard tightening torques. The other threaded connections not specified must therefore be tightened to the torque stated in the overview of standard tightening torques.

When attachment bolts and nuts are replaced, it is important that - unless stated otherwise - these bolts and nuts are of exactly the same length and property class as those removed.

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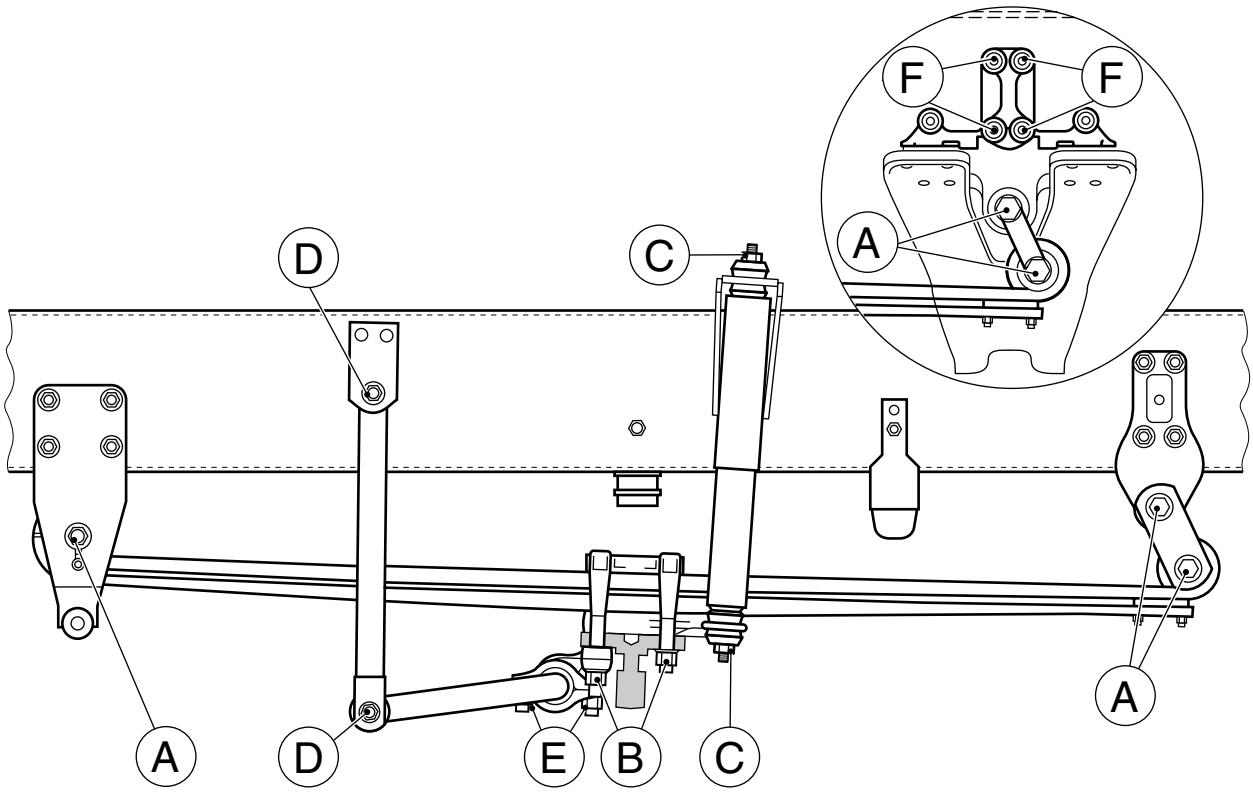
Front axle, leaf-sprung



C9 00 477

A	Attachment bolt M24 for spring assembly, property class 10.9	880 Nm
B	U-bolt nut	
	- if flange nut M20, with yellow washer	450 ± 40 Nm (1)
	- if yellow zinc-plated hexagonal nut M20, property class 10, with black washer	400 ± 40 Nm (1)
C	Self-locking nut M16 for shock absorber	65 Nm
D	Attachment bolt/nut M16 for stabiliser rod shackle, property class 10.9/10	260 ± 20 Nm
E	Attachment bolt/nut M12 for stabiliser rod bearing bush cover, property class 10.9/10	110 ± 8 Nm
F	Attachment bolt/nut M14 for spring bracket, property class 10.9/10	170 ± 15 Nm (2)

(1) Evenly tighten the two U-bolt nuts alternately.
(2) Only applies in case of tandem axle/trailing axle

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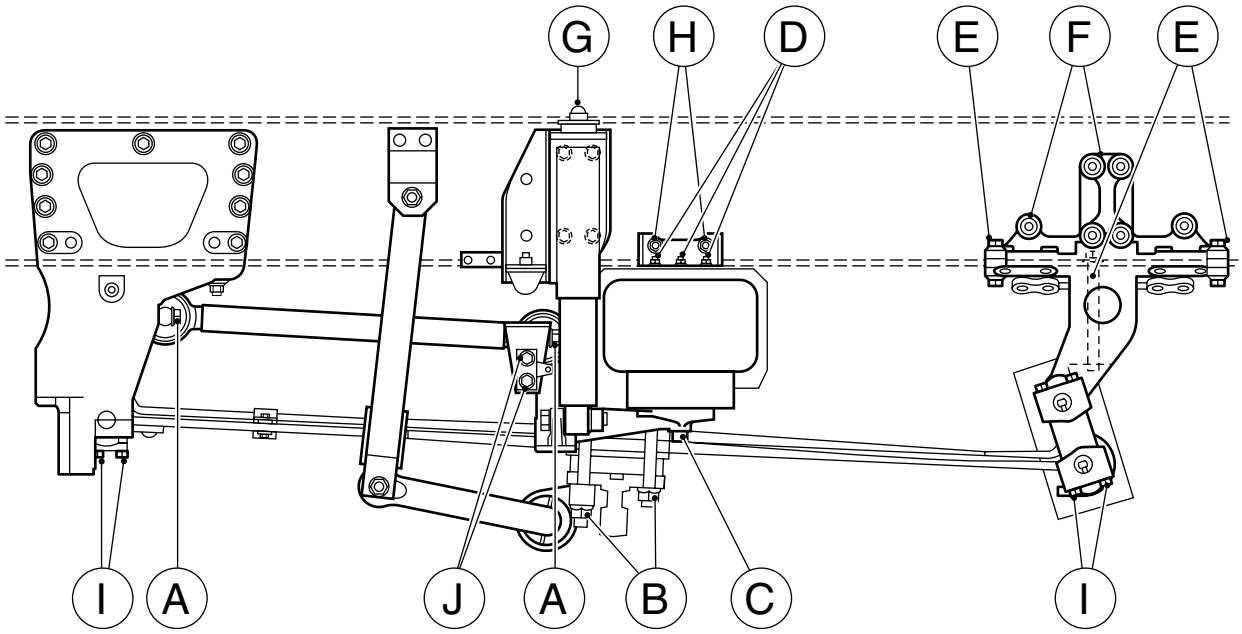
Front axle, air-sprung



C9 00 479

A	Attachment bolt M16 for torque rod, property class 10.9	260 ± 20 Nm
B	U-bolt nut	
	- if flange nut M22	700 ± 50 Nm (1)
	- if yellow zinc-plated hexagonal nut M22, property class 10, with black washer	530 ± 40 Nm (1)
C	Attachment bolt M16 for bellows, property class 8.8	195 Nm (2)
D	Attachment nut M10 for bellows, property class 10	46 Nm (2)
E	Attachment bolt/nut M16 for spring bracket, property class 10.9/10	260 ± 20 Nm
F	Attachment bolt/nut M14 for spring bracket, property class 10.9/10	170 ± 15 Nm
G	Self-locking nut M16 for shock absorber	65 Nm
H	Attachment bolt/nut M12 for bellows support, property class 10.9/10	110 ± 8 Nm
I	Attachment bolt M10 for pin attachment of spring assembly, property class 10.9	60 ± 4 Nm
J	Attachment bolt M12 for torque rod support, property class 10.9	110 ± 8 Nm

(1) Evenly tighten the two U-bolt nuts alternately.
(2) Bellows must first be tightened on the chassis side.

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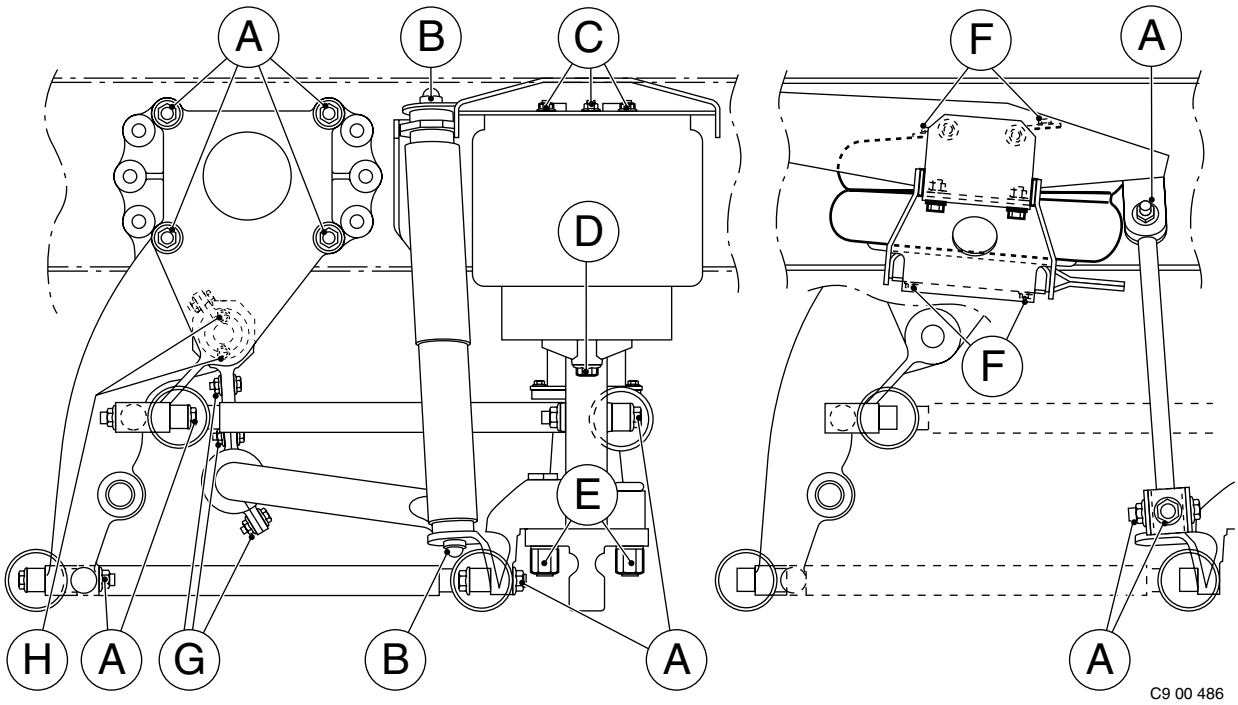
Leading rear axle, vehicle in FTG, FAG version



A	Attachment bolt/nut M16 for torque rod (support), property class 10.9/10	260 ± 20 Nm
B	Self-locking nut M16 for shock absorber	65 Nm
C	Attachment nut M10 for bellows, property class 10	46 Nm (1)
D	Attachment bolt M16 for bellows, property class 10.9	195 Nm (1)
E	U-bolt nut	
	- if flange nut M22	700 ± 50 Nm (2)
	- if yellow zinc-plated hexagonal nut M22, property class 10, with black washer	530 ± 40 Nm (2)
F	Attachment bolt M8 for lifting bellows, property class 10.9	20 Nm
G	Attachment bolt/nut for stabiliser bar bracket	
	- if M14, property class 10.9/10	170 ± 15 Nm
	- if M16, property class 10.9/10	260 ± 20 Nm
H	Attachment bolts M8 for locking plate, property class 10.9	30 Nm

(1) Bellows must first be tightened on the chassis side.
(2) Evenly tighten the two U-bolt nuts alternately.

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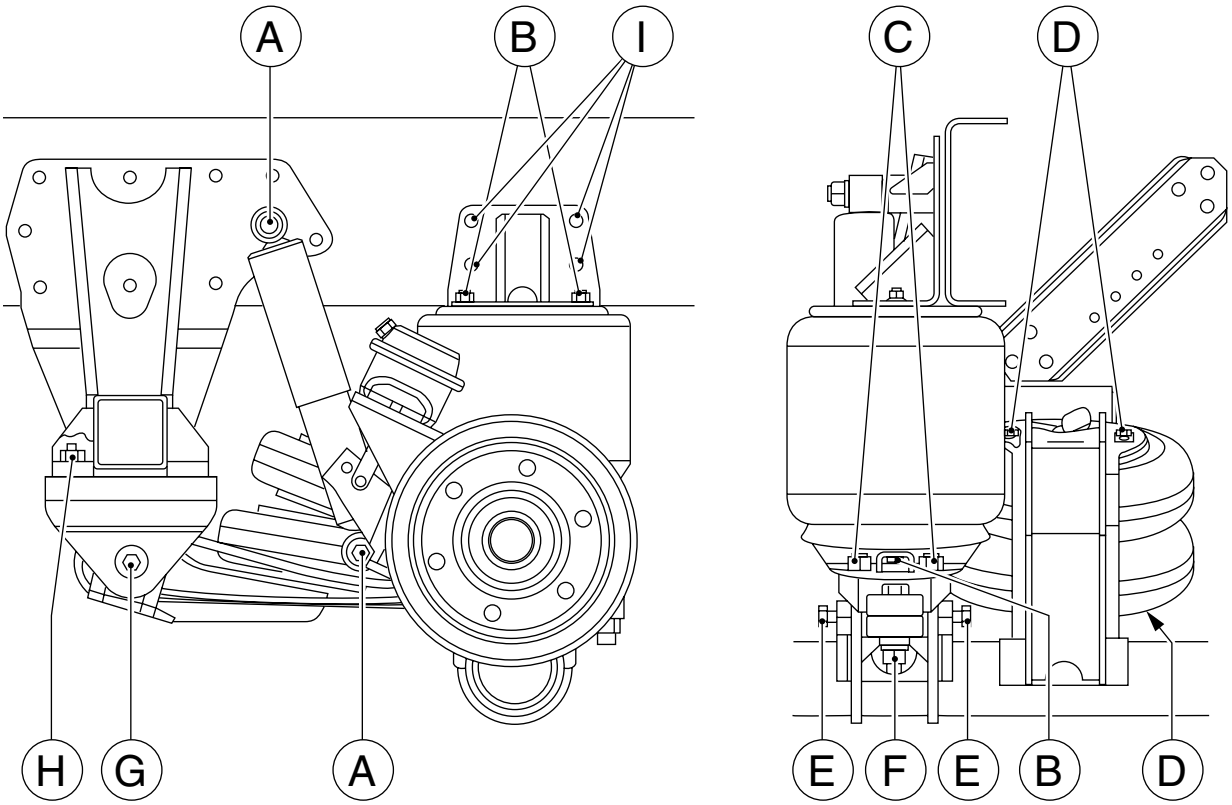
Leading rear axle, vehicle in FTP version



C9 00 481

A	Attachment bolt M20 for shock absorber, property class 8.8	250 ± 25 Nm
B	Attachment nut M12 for bellows	30 Nm
C	U-bolt nut M20, property class 10.9	553 Nm (1)
D	Attachment nut M10 for bellows	30 Nm
E	Attachment bolt M16 for leaf spring, property class 10.9	100 Nm
F	Attachment bolt/nut M20 for leaf spring, property class 10.9/10	553 Nm
G	Attachment bolt/nut M24 for leaf spring	830 Nm
H	Attachment bolt/nut M16 for spring bracket, property class 10.9	310 Nm
I	Attachment bolt/nut M10 for bellows support, property class 10.9/10	60 ± 4 Nm

(1) Evenly tighten the two U-bolt nuts alternately.

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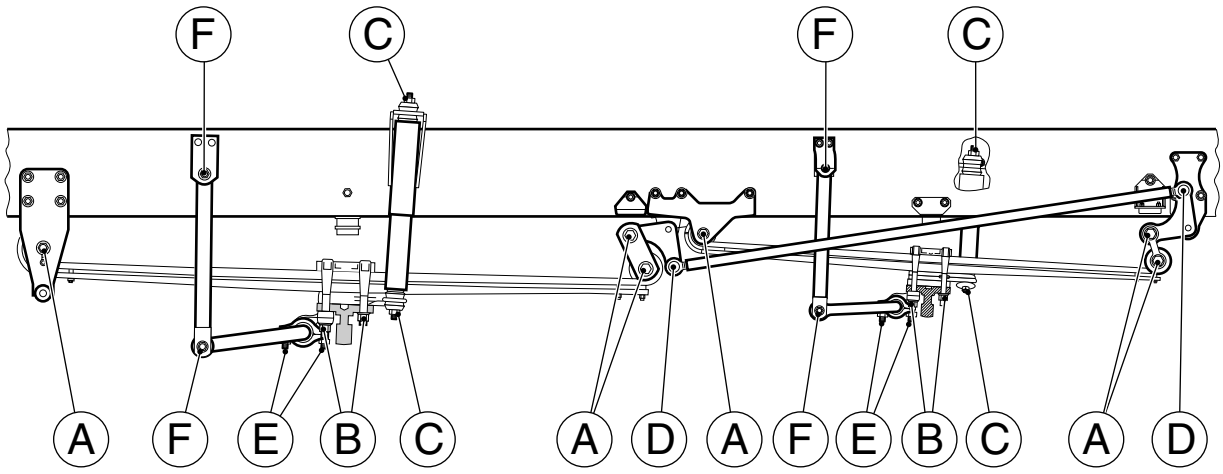
Double front axle



C900465

A	Attachment bolt M24 for spring assembly, property class 10.9	880 Nm
B	U-bolt nut	
	- if flange nut M20, with yellow washer	450 ± 40 Nm (1)
	- if yellow zinc-plated hexagonal nut M20, property class 10, with black washer	400 ± 40 Nm (1)
C	Self-locking nut M16	65 Nm
D	Ball end nut	
	- if self-locking nut	285 Nm (2)
	- if castle nut	285 Nm (3)
E	Attachment bolt/nut M12 for stabiliser rod bearing bush cover, property class 10.9/10	110 ± 8 Nm
F	Attachment bolt/nut M16 for stabiliser rod shackle, property class 10.9/10	260 ± 20 Nm

(1) Evenly tighten the two U-bolt nuts alternately.
(2) Fit new self-locking nut.
(3) Tighten until the split pin fits (max. 60°).

It is not allowed to fit a self-locking nut to the ball end with split pin hole.

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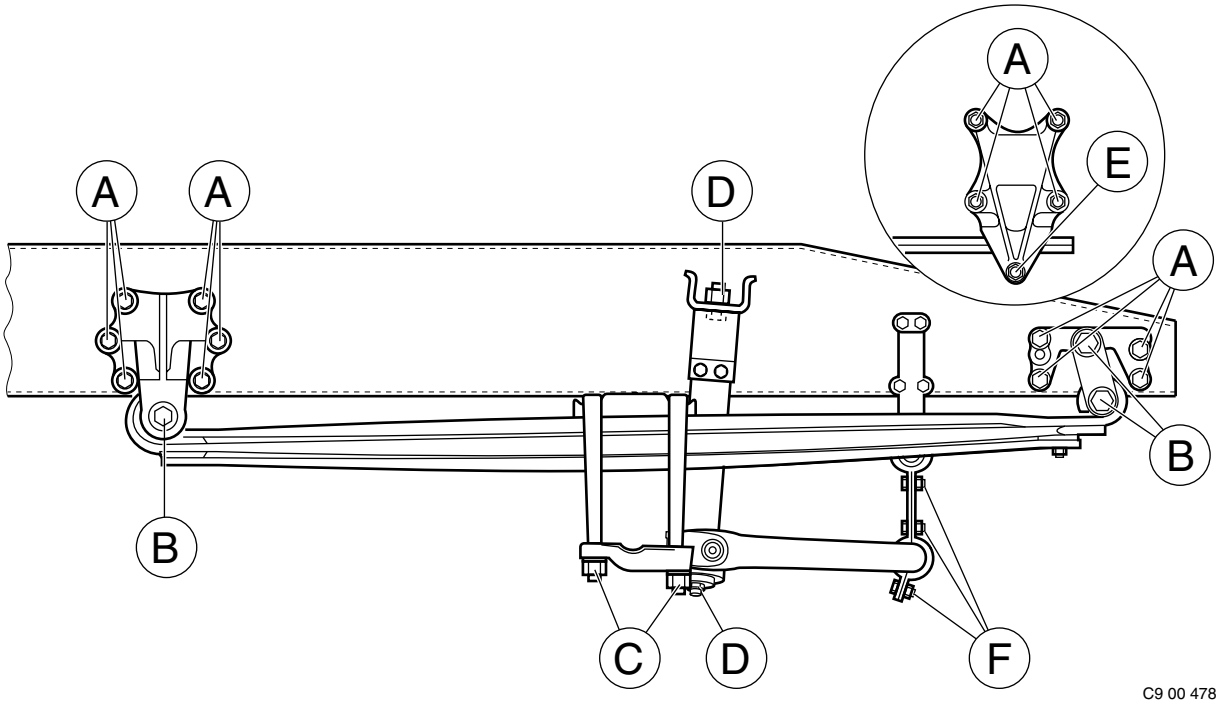
Rear axle, leaf suspension

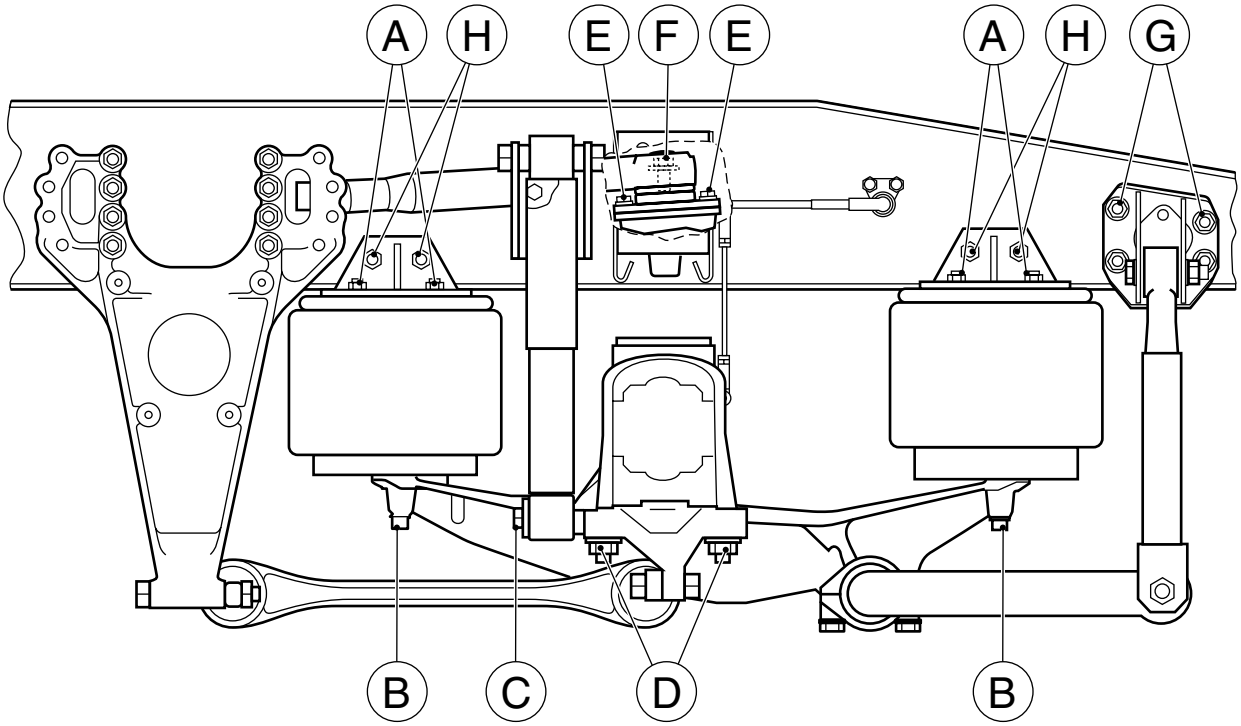


A	Attachment bolt/nut M16 for spring bracket, property class 10.9/10	260 ± 20 Nm
B	Attachment bolt M24 for spring assembly, property class 10.9	880 Nm
C	U-bolt nut	
	- if flange nut M24, with black washer	750 ± 50 Nm (1)
	- if yellow zinc-plated hexagonal nut M24, property class 10, with black washer	615 ± 50 Nm (1)
D	Self-locking nut M16 for shock absorber	65 Nm
E	Catch bolt M12, property class 10.9	68 ± 12 Nm
F	Attachment bolt/nut M14 for stabiliser rod bracket, property class 10.9/10	170 ± 15 Nm

(1) Evenly tighten the two U-bolt nuts alternately.

0

Rear axle, air-sprung



C9 00 480

A	Attachment nut M10 for bellows, property class 10	46 Nm (1)
B	Attachment bolt M16 for bellows, property class 8.8	195 Nm (1)
C	Attachment bolt M20 for shock absorber, property class 10.9	520 ± 40 Nm
D	U-bolt nut	
	- if black high hexagonal nut M24 with black washer	770 ± 60 Nm (2)
	- if yellow zinc-plated hexagonal nut M24, property class 10, with black washer	615 ± 50 Nm (3)
E	Clamping flange bolt M18 for triangular link, property class 12.9	460 ± 40 Nm
F	Attachment bolt M14, for triangular link ball, property class 10.9	135 Nm
G	Attachment bolt/nut M16 for stabiliser shackle support, property class 10.9/10	260 ± 20 Nm
H	Attachment bolt/nut M10 for bellows support, property class 10.9/10	60 ± 4 Nm

(1) Bellows must first be tightened on the chassis side.
(2) The high hexagonal nut can be recognised by the nut height, which is 1.5 x thread ∅. Evenly tighten the two U-bolt nuts alternately.
(3) The yellow zinc-plated hexagonal nut can be recognised by the nut height, which is 1 x thread ∅. Evenly tighten the two U-bolt nuts alternately.

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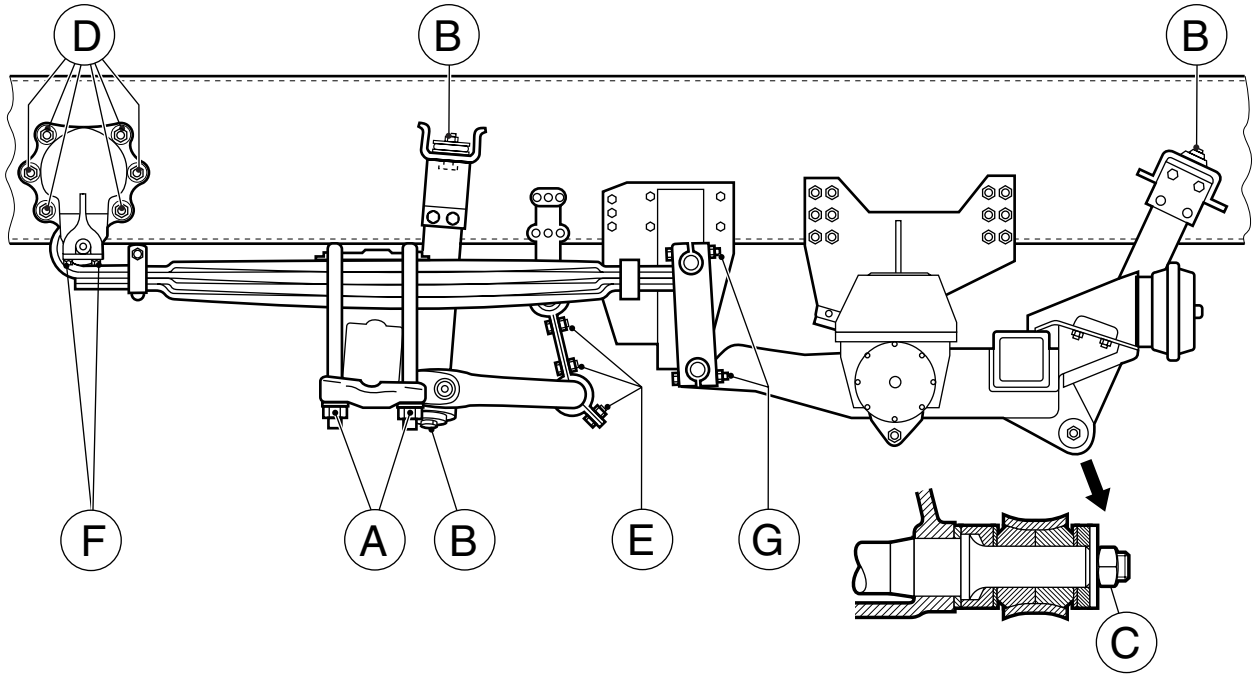
Trailing axle, leaf suspension



C9 00 483

A	U-bolt nut	
	- if flange nut M24	750 ± 50 Nm (1)
	- if yellow zinc-plated hexagonal nut M24, property class 10, with black washer	615 ± 50 Nm (1)
B	Self-locking nut M16	65 Nm
C	Shock absorber attachment nut	260 ± 20 Nm
D	Attachment bolt/nut M16 for spring bracket, property class 10.9/10	260 ± 20 Nm
E	Attachment bolt/nut M14 for stabiliser rod bracket, property class 10.9/10	170 ± 15 Nm
F	Attachment bolt M10 for pin attachment of spring assembly, property class 10.9	60 ± 4 Nm
G	Attachment bolt/nut M12 for spring shackle, property class 10.9/10	110 ± 8 Nm

(1) Evenly tighten the two U-bolt nuts alternately.

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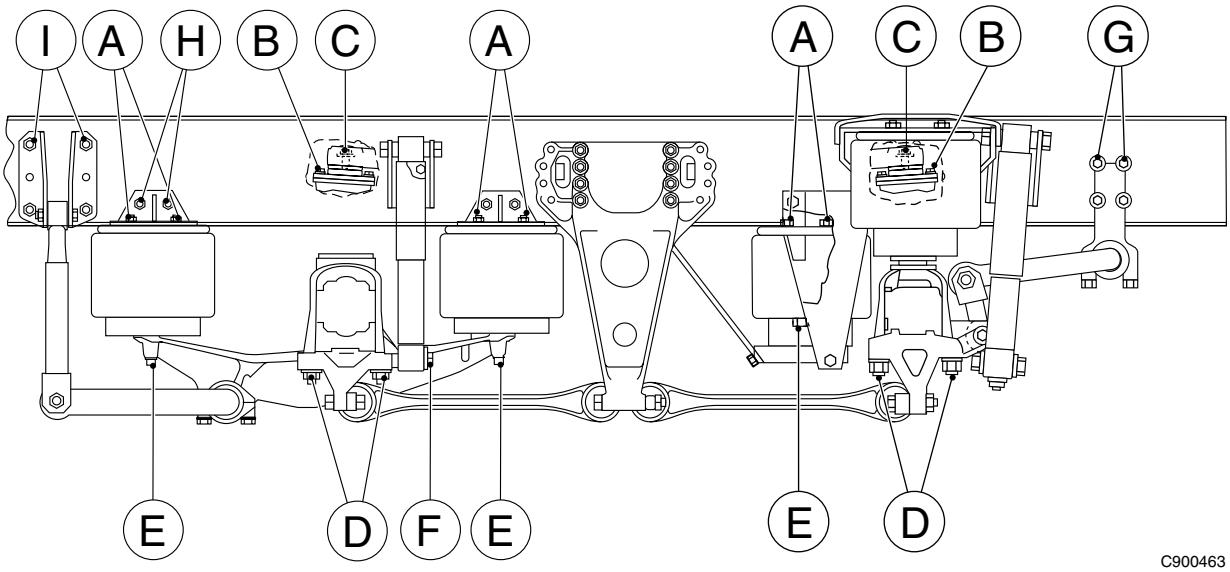
Trailing axle, air-sprung, 6 bellows version



A	Attachment nut M10 for bellows, property class 10	46 Nm (1)
B	Clamping flange bolt M18 for triangular link, property class 12.9	460 ± 40 Nm
C	Attachment bolt M14, for triangular link ball, property class 10.9	135 Nm
D	U-bolt nut	
	- if black high hexagonal nut M24 with black washer	770 ± 60 Nm (2)
	- if yellow zinc-plated hexagonal nut M24, property class 10, with black washer	615 ± 50 Nm (3)
E	Attachment bolt M16 for bellows, property class 8.8	195 Nm (1)
F	Attachment bolt M20 for shock absorber, property class 10.9	520 ± 40 Nm
G	Attachment bolt/nut M16 for stabiliser shackle support, property class 10.9/10	260 ± 20 Nm
H	Attachment bolt/nut M10 for bellows support, property class 10.9/10	60 ± 4 Nm
I	Attachment bolt/nut M16 for stabiliser shackle support, property class 10.9/10	260 ± 20 Nm

(1) Bellows must first be tightened on the chassis side.
(2) The high hexagonal nut can be recognised by the nut height, which is 1.5 x thread ∅. Evenly tighten the two U-bolt nuts alternately.
(3) The yellow zinc-plated hexagonal nut can be recognised by the nut height, which is 1 x thread ∅. Evenly tighten the two U-bolt nuts alternately.

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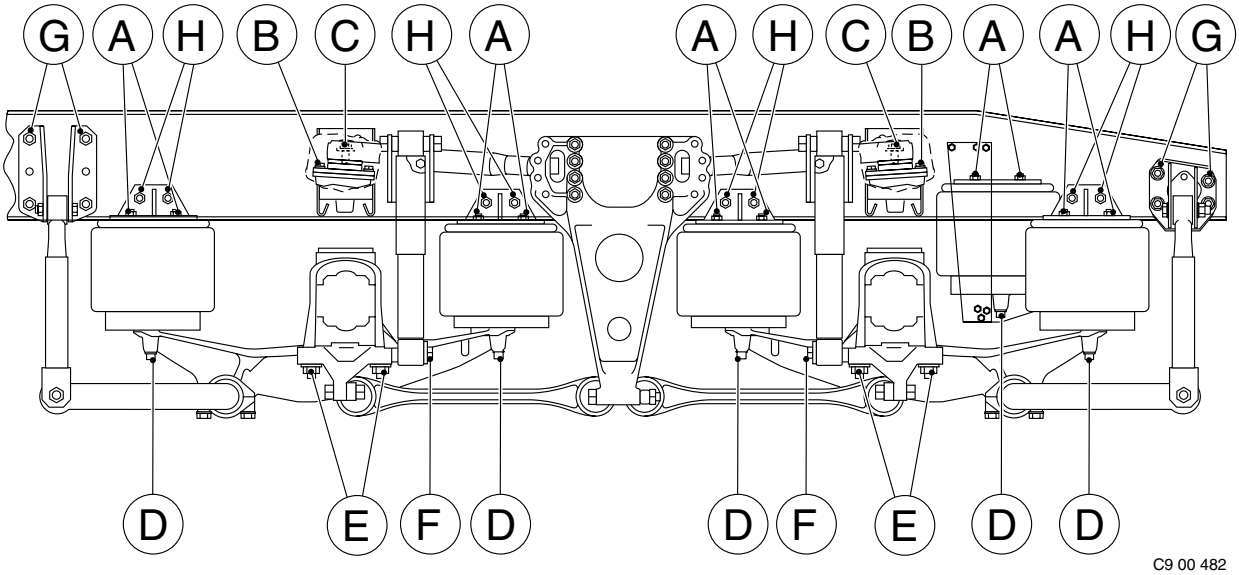
Trailing axle, air-sprung, 8 bellows version



C9 00 482

A	Attachment nut M10 for bellows, property class 10	46 Nm (1)
B	Clamping flange bolt M18 for triangular link, property class 12.9	460 ± 40 Nm
C	Attachment bolt M14, for triangular link ball, property class 10.9	135 Nm
D	Attachment bolt M16 for bellows, property class 8.8	195 Nm (1)
E	U-bolt nut	
	- if black high hexagonal nut M24 with black washer	770 ± 60 Nm (2)
	- if yellow zinc-plated hexagonal nut M24, property class 10, with black washer	615 ± 50 Nm (3)
F	Attachment bolt M20 for shock absorber, property class 10.9	520 ± 40 Nm
G	Attachment bolt/nut M16 for stabiliser shackle support, property class 10.9/10	260 ± 20 Nm
H	Attachment bolt/nut M10 for bellows support, property class 10.9/10	60 ± 4 Nm

(1) Bellows must first be tightened on the chassis side.
(2) The high hexagonal nut can be recognised by the nut height, which is 1.5 x thread ∅. Evenly tighten the two U-bolt nuts alternately.
(3) The yellow zinc-plated hexagonal nut can be recognised by the nut height, which is 1 x thread ∅. Evenly tighten the two U-bolt nuts alternately.

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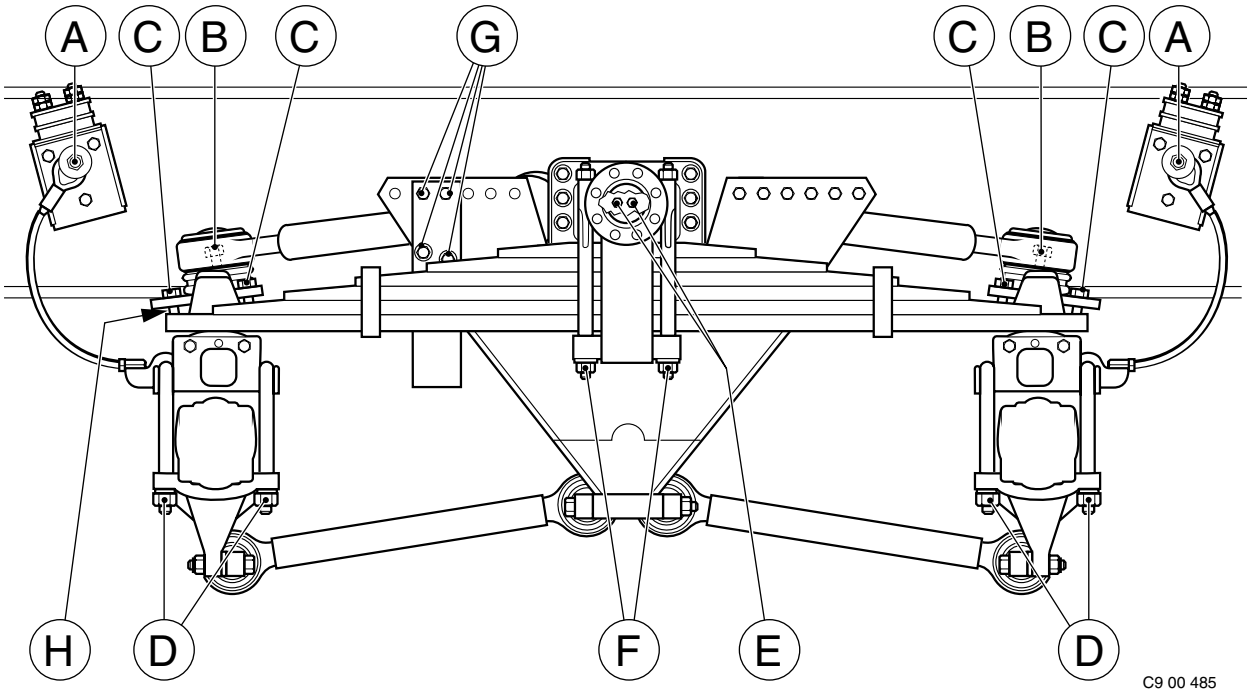
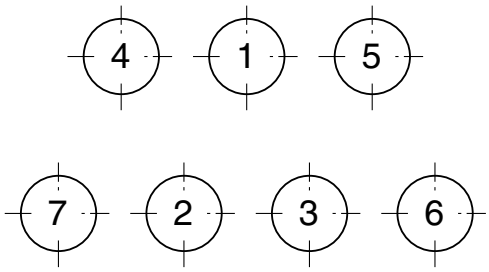
Tandem axle, leaf-sprung, trapezoidal leaf spring version



A	Attachment bolt/nut M16 for arresting cable	150 ± 20 Nm
B	Attachment bolt M14, for triangular link ball, property class 10.9	135 Nm
C	Clamping flange bolt M18 for triangular link, property class 12.9	460 ± 40 Nm
D	U-bolt nut	
	- if flange nut M20	450 ± 40 Nm (1)
	- if yellow zinc-plated hexagonal nut M20, property class 10, with black washer	400 ± 40 Nm (1)
E	Attachment bolt M14, for bearing bush plate, property class 10.9	170 ± 15 Nm (2)
F	Tie rod nut	
	if flange nut M22	650 ± 50 Nm (1)
	if yellow zinc-plated hexagonal nut M22, property class 10, with black washer	480 ± 40 Nm (1)
G	Attachment bolt/nut M12 for alignment plate, property class 10.9/10	110 ± 8 Nm

H Tighten the bolts according to the standard tightening torque, in the order shown.

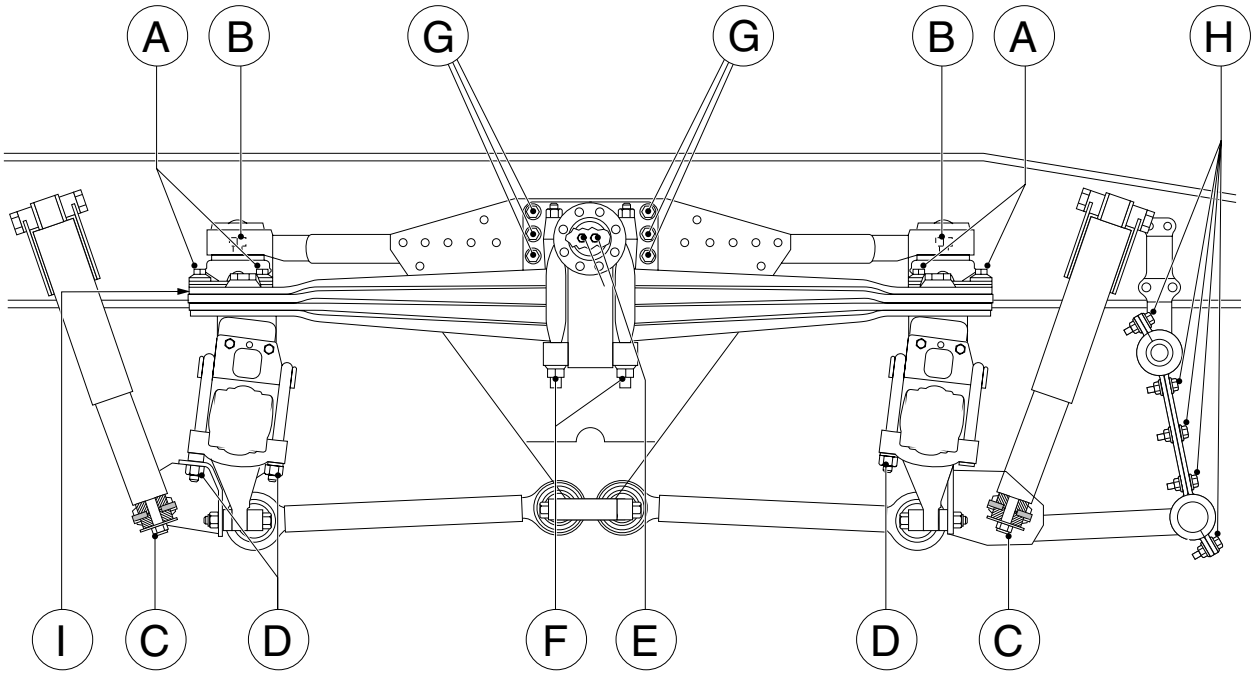


C9 00 144

(1) Evenly tighten the two U-bolt/tie rod nuts alternately.
(2) Fasten with Loctite 243.

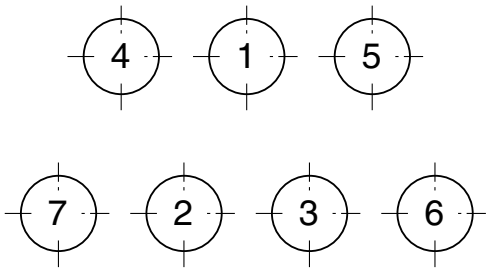
0

Tandem axle, leaf-sprung, parabolic leaf spring version



A	Clamping flange bolt M18 for triangular link, property class 12.9	460 ± 40 Nm
B	Attachment bolt M14, for triangular link ball, property class 10.9	135 Nm
C	Self-locking nut M16 for shock absorber	65 Nm
D	U-bolt nut	
	- if flanged nut	450 ± 40 Nm (1)
	- if yellow zinc-plated hexagonal nut M20, property class 10, with black washer	400 ± 40 Nm (1)
E	Attachment bolt M14, for bearing bush plate, property class 10.9	170 ± 15 Nm (2)
F	Tie rod nut	
	- if flanged nut	650 ± 50 Nm (1)
	- if yellow zinc-plated hexagonal nut M22, property class 10, with black washer	480 ± 40 Nm (1)
G	Attachment bolt M16 for pivot pin flange, property class 10.9	260 ± 20 Nm
H	Attachment bolt/nut M14 for stabiliser rod bracket, property class 10.9/10	170 ± 15 Nm

I Tighten the bolts according to the standard tightening torque, in the order shown.

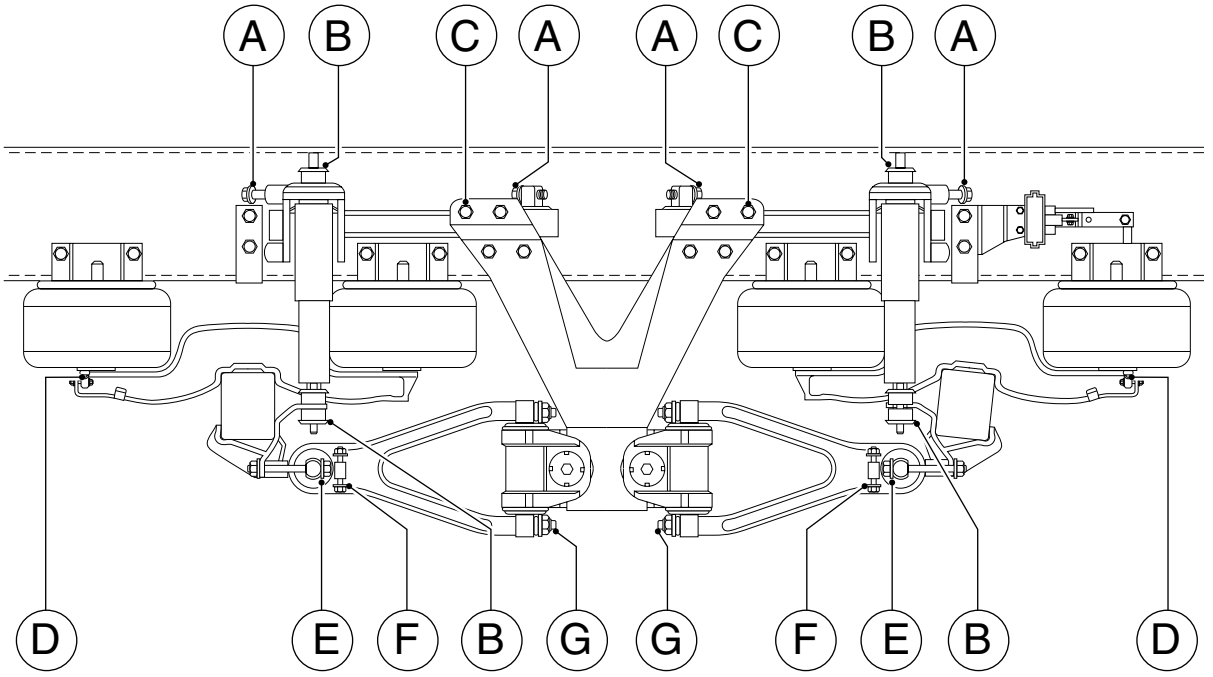


C9 00 144

(1) Evenly tighten the two U-bolt/tie rod nuts alternately.
(2) Fasten with Loctite 243.

0

Tandem axle, air-sprung, Meritor version



C9 00 404

A	Attachment bolt/nut M16 for torque rod, property class 10.9/10	260 ± 60 Nm
B	Tighten shock absorber attachment nut until the rubber sleeve and the steel ring have the same diameter.	
C	Attachment bolt/nut M22 for yoke, property class 10.9/10	750 Nm
D	Attachment bolt for bellows 1/2" UNC	34 ± 7 Nm
E	Attachment bolt/nut M16 for torque rod, property class 10.9/10	260 ± 60 Nm
F	Attachment bolt/nut M10 for torque rod, property class 10.9/10	60 ± 4 Nm
G	Attachment nut M20 for torque rod, property class 10.9	520 ± 40 Nm

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3. REAR AXLE ALIGNMENT

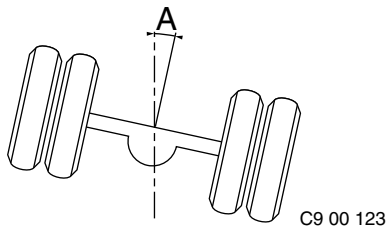
3.1 GENERAL

Rear axle misalignment standard
The angle achieved by the driven rear axle relative to the vehicle centreline is calculated from the angle achieved by both wheels of this axle relative to the vehicle centreline. See "Rear axle alignment".

Driven axle relative to the vehicle centreline:

- max. 4 mm/m (angle A in drawing).

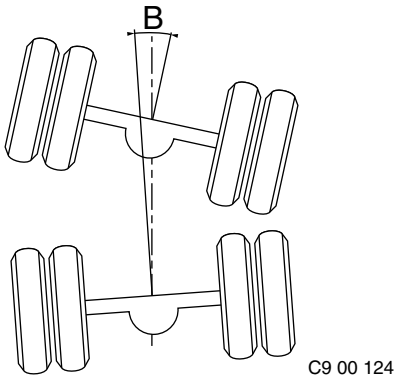
  This value also applies to the individual tandem axles and the driven axle of the trailing axle suspension.



C9 00 123

Non-parallelism of the rear tandem axle relative to the front tandem axle:

- max. 2 mm/m (angle B in drawing).



C9 00 124

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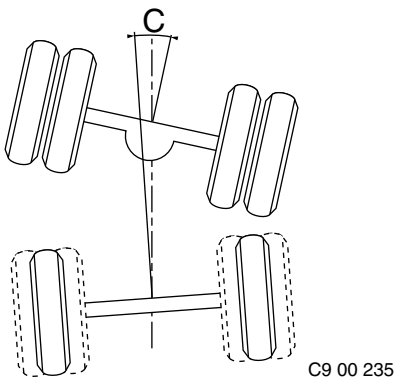
Non-parallelism of the trailing axle relative to the driven axle:

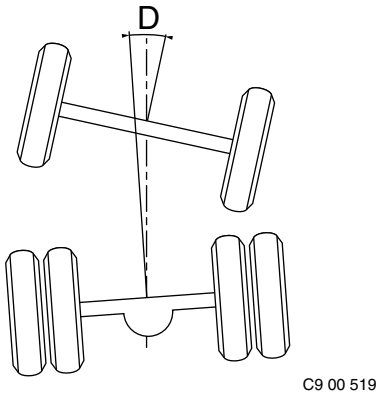
- max. 2 mm/m (angle C in drawing).



C9 00 235

Non-parallelism of the unsteered leading rear axle (FTP) relative to the driven axle:

- max. 2 mm/m (angle D in drawing).



C9 00 519

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4. FAG

4.1 GENERAL

Valve adjustment

Pressure-limiting valve	7.0 bar
Pressure-relief valve	0.5 bar

Control values/adjustment of height-control valve, axle load ratio 6.0/10.0 and fitted with leaf spring suspension (DAF no. 1368293)

Lever length	60 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.4
40,000	0.7
50,000	1.1
60,000	1.5
70,000	1.9
80,000	2.2
90,000	2.6
100,000	3.0
110,000	3.4
120,000	3.7
130,000	4.1
140,000	4.5
150,000	4.9
160,000	5.2
170,000	5.6
180,000	6.0
190,000	6.4
200,000	6.7

0

Control values/adjustment of height-control valve, axle load ratio 6.0/10.0 and fitted with leaf spring suspension (DAF no. 1386990)

Lever length 70 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.4
40,000	0.7
50,000	1.1
60,000	1.5
70,000	1.9
80,000	2.2
90,000	2.6
100,000	3.0
110,000	3.4
120,000	3.7
130,000	4.1
140,000	4.5
150,000	4.9
160,000	5.2
170,000	5.6
180,000	6.0
190,000	6.4
200,000	6.7

0

Control values/adjustment of height-control valve, axle load ratio 7.1/11.5 and fitted with leaf spring suspension (DAF no. 1368293)

Lever length 60 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.4
40,000	0.8
50,000	1.1
60,000	1.5
70,000	1.9
80,000	2.3
90,000	2.7
100,000	3.1
110,000	3.4
120,000	3.8
130,000	4.2
140,000	4.6
150,000	5.0
160,000	5.3
170,000	5.7
180,000	6.1
190,000	6.5
200,000	6.9

0

Control values/adjustment of height-control valve, axle load ratio 7.1/11.5 and fitted with leaf spring suspension (DAF no. 1386990)

Lever length 70 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.4
40,000	0.8
50,000	1.1
60,000	1.5
70,000	1.9
80,000	2.3
90,000	2.7
100,000	3.1
110,000	3.4
120,000	3.8
130,000	4.2
140,000	4.6
150,000	5.0
160,000	5.3
170,000	5.7
180,000	6.1
190,000	6.5
200,000	6.9

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0

Control values/adjustment of height-control valve, axle load ratio 7.5/11.5 and fitted with leaf spring suspension (DAF no. 1368293)

Lever length 60 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.4
40,000	0.8
50,000	1.2
60,000	1.6
70,000	2.0
80,000	2.4
90,000	2.8
100,000	3.2
110,000	3.6
120,000	4.0
130,000	4.4
140,000	4.8
150,000	5.2
160,000	5.5
170,000	5.9
180,000	6.3
190,000	6.7
200,000	7.0

0

Control values/adjustment of height-control valve, axle load ratio 7.5/11.5 and fitted with leaf spring suspension (DAF no. 1368293)

Lever length 70 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.3
40,000	0.7
50,000	1.1
60,000	1.4
70,000	1.8
80,000	2.4
90,000	2.5
100,000	2.9
110,000	3.3
120,000	3.6
130,000	4.0
140,000	4.4
150,000	4.7
160,000	5.1
170,000	5.5
180,000	5.8
190,000	6.2
200,000	6.6

0

Control values/adjustment of height-control valve, axle load ratio 7.5/11.5 and fitted with leaf spring suspension (DAF no. 1386990)

Lever length 70 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.4
40,000	0.8
50,000	1.2
60,000	1.6
70,000	2.0
80,000	2.4
90,000	2.8
100,000	3.2
110,000	3.6
120,000	4.0
130,000	4.4
140,000	4.8
150,000	5.2
160,000	5.5
170,000	5.9
180,000	6.3
190,000	6.7
200,000	7.0

0

Control values/adjustment of height-control valve, axle load ratio 7.5/11.5 and fitted with leaf spring suspension (DAF no. 1386990)

Lever length 80 mm

Joint axle load of leading rear axle/ drive shaft (N)	Bellows pressure (bar)
30,000	0.3
40,000	0.7
50,000	1.1
60,000	1.4
70,000	1.8
80,000	2.2
90,000	2.5
100,000	2.9
110,000	3.3
120,000	3.6
130,000	4.0
140,000	4.4
150,000	4.7
160,000	5.1
170,000	5.5
180,000	5.8
190,000	6.2
200,000	6.6
205,000	6.7

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1. SHOCK ABSORBERS

1.1 FAULT-FINDING TABLE

SYMPTOM: SHOCK ABSORBER PRODUCES NOISE (CHATTERING, BUMPING ETC.)	
Possible cause	**Remedy**
Shock absorber is loose.	Secure shock absorber.
Attachment rubbers too soft.	Fit new rubbers.
Shock absorber comes into contact with other components.	Remove components or fasten them.
Shock absorber cover is loose.	Secure shock absorber cover or replace shock absorber.

SYMPTOM: SHOCK ABSORBER DOES NOT FUNCTION	
Possible cause	**Remedy**
Internal shock absorber defect.	Replace shock absorber.
Shock absorber loses oil.	Replace shock absorber.

SYMPTOM: SHOCK ABSORBER LEAKAGE	
Possible cause	**Remedy**
Defective piston rod sealing. Note: a thin, greasy layer is normal.	Replace shock absorber.

SYMPTOM: SHOCK ABSORBER TOO HARD	
Possible cause	**Remedy**
Incorrect shock absorber type fitted.	Fit correct shock absorber type.
Internal shock absorber defect.	Check shock absorber using a test bench and replace, if required.

SYMPTOM: SHOCK ABSORBER TOO SOFT	
Possible cause	**Remedy**
Incorrect shock absorber type fitted.	Fit correct shock absorber type.
Internal shock absorber wear.	Check shock absorber using a test bench and replace, if required.
Shock absorber loses oil.	Replace shock absorber.
Vehicle overloaded.	Adjust vehicle loading.

1

SYMPTOM: POOR DRIVING CHARACTERISTICS/FLAT WEAR SPOTS ON THE TYRES	
Possible cause	**Remedy**
Incorrect damping.	Check shock absorbers using a test bench and replace, if required.
Vehicle overloaded.	Adjust vehicle loading.

SYMPTOM: SHOCK ABSORBER HITS END STOP	
Possible cause	**Remedy**
Defective stop rubber.	Replace stop rubber.
Insufficient damping.	See under Shock absorber too soft.
Vehicle overloaded.	Adjust vehicle loading.

2. LEAF SUSPENSION

2.1 FAULT-FINDING TABLE

SYMPTOM: LOOSE U-BOLTS	
Possible cause	**Remedy**
Use of a U-bolt or nut of an incorrect property class.	Use U-bolts and nuts of the correct property class.
The tightening torque used for the U-bolt nut was too low.	Tighten the U-bolt to the specified torque.
Reuse of a U-bolt with corroded or damaged thread.	Fit new U-bolt.
No or inadequate cleaning of the thread (which includes removal of paint) before reuse of the U-bolt.	Thoroughly clean the thread when reusing it.
No oil or faulty application of oil on the thread and the bearing surface of the nut.	Apply the oil as prescribed.
The nut has been tightened using a tool rotating too fast. There is a risk of the nut being welded to the thread.	Tighten the nut slowly.
Coating (i.e. paint) on the contact faces of the connection.	Clean the contact faces before assembly.
Inadequate retorquing of the U-bolt nut or no retorquing.	Tighten the U-bolt nut as specified.

SYMPTOM: BROKEN SPRING	
Possible cause	**Remedy**
Regular overloading.	Adjust vehicle loading.
Driving too fast over bad roads.	Adjust speed when the road is bad.
Notching effect due to welding or grinding activities.	Cover spring assembly when welding or grinding.
Spring damaged due to impact of a steel hammer.	Never hit the springs using a steel hammer or some other hard tool.
Incorrect repair of a spring leaf which has broken before.	When replacing a broken spring leaf, always replace the leaf on top and under the broken leaf; better yet, replace the entire spring assembly.
Spring has been heated.	Replace spring assembly. Springs should never be heated.

1

SYMPTOM: SPLAYING OF THE SPRING ASSEMBLY (BROKEN SPRING SHACKLES)	
Possible cause	**Remedy**
Incorrect pre-tension of the U-bolts.	See symptom: Loose U-bolts.

SYMPTOM: SPRING HITS END STOP	
Possible cause	**Remedy**
Vehicle overloaded.	Adjust vehicle loading.
Sagged spring assembly.	Check spring opening of both spring assemblies. Replace spring assemblies.
Broken spring.	See symptom: Broken spring.

SYMPTOM: SHIFTING OR BREAKING OF CENTRE BOLT	
Possible cause	**Remedy**
Incorrect pre-tension of the U-bolts.	See symptom: Loose U-bolts.

SYMPTOM: BUMPING OR CHATTERING OF THE SPRING	
Possible cause	**Remedy**
Shackle pin bearing play at air-sprung front axle.	Replace shackle pin/bearing bush.
Loose U-bolts.	See symptom: Loose U-bolts.
Loose shackle pin locking at air-sprung front axle.	Secure the shackle pin locking.
Spring bracket is loose.	Secure the spring bracket.
Spring comes into contact with other components during spring action.	Check freedom of movement of spring.

3. REAR AXLE ALIGNMENT

3.1 FAULT-FINDING TABLE

SYMPTOM: AXLE MISALIGNMENT	
Possible cause	**Remedy**
Axle suspension clearance.	Check the axle suspension. Replace the worn parts.
Loose U-bolts.	Check the tightening torques of the U-bolts. Tighten the nuts to the specified tightening torques.
Shifted centre bolt.	Check the centre bolt. Check the tightening torques of the U-bolts.
Loose or shifted front spring bracket.	Check the spring brackets. Fit the spring bracket as specified.
Incorrect spring bracket fitted.	Fit the spring bracket as specified.
Sagged spring assembly or spring assembly with broken spring leaves.	Check opening of both spring assemblies. Replace spring assemblies.
Difference in length between the spring assemblies.	Measure the centre-to-centre distance between shackle pin or spring eye bolt and centre bolt. Adjust the alignment or replace the spring assemblies.
Misalignment of the vehicle due to wrongly adjusted or defective height adjustment.	Check/replace sensor. Recalibrate.
Bent torque rod (air suspension and tandem axle).	Check the torque rods. Replace if necessary.
Incorrectly fitted torque rods (air suspension and tandem axle).	Check the torque rods. Fit the torque rods correctly.
Difference in length between the torque rods at the vehicle's left and right sides (air suspension and tandem axle).	Measure the length of the torque rods. Adjust the difference in length.
Bent axle housing.	Check the straightness of the axle housing. If possible, adjust by changing the axle alignment.
Bent leaf-sprung trailing axle yoke.	Replace the trailing axle yoke.
Misalignment of the vehicle because the superstructure is heavier on one side.	Measure the wheel pressure. Distribute the weight more evenly.
Inadequate alignment of axle suspension.	Check the alignment. Adjust the axle alignment.
Bent chassis.	Measure the chassis. Straighten the chassis, if possible.
Chassis side members have shifted in relation to one another.	Measure the chassis. Straighten the chassis, if possible. Align the axle.

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1. GENERAL

1.1 REPAIRS TO THE CHASSIS

- Any welding, aligning, drilling and wheelbase alteration activities that are not described in this workshop manual or in any of the latest releases of DAF's Chassis Guidelines must be authorised by DAF.
- Following chassis repair, the cause of the chassis damage should be rectified.

Welding
- Chassis welding may only be carried out by welders holding a valid EN 287-1 certificate.
- For welding operations on the steel grade KF 375 chassis, the welding electrode must meet one of the following standards:

  ISO 2560: E 515 B 24(H)
  DIN 1913 (January 1976): E 5155 B 10
  EN 499

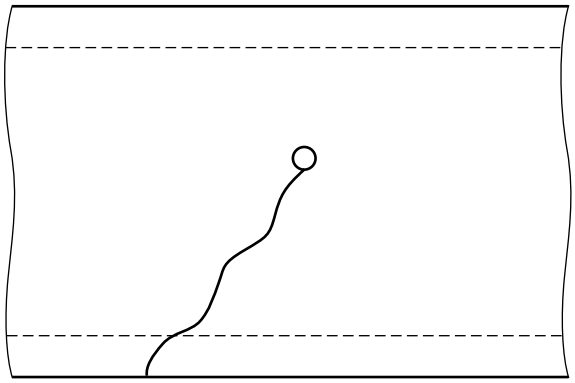
- Slag inclusions and other contamination in the welds are totally unacceptable.

Note:
Welding on a chassis constructed of high-tensile strength steel grades KF 420, KF 500 and KF 600 is strongly advised against.
If, however, you do wish to weld a high-tensile strength steel chassis, contact must always first be sought with DAF.
The welding electrode must meet the standard:

DIN 8529: EY 5066 1.5 NiNoB

To repair cracks in the chassis, proceed as follows, taking account of the guidelines given above:

1. Remove all parts restricting a clear working area.
2. Thoroughly clean the crack so that the course of the crack is clearly visible.
3. Drill a small hole at the end of the crack. This will prevent the crack from continuing.



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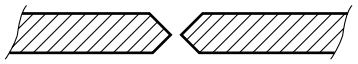
4. Thoroughly grind out the crack on both sides.
5. Take the necessary precautions to prevent damage to electronic components. Place the earth clamp as close as possible to the weld and avoid bridges.
6. Lay a bead on one side of the ground-out crack.
7. Gouge or grind off the material at the back of the bead (see the arrow) so that the new weld material is clearly visible.
8. Finish-weld the X-seam in the usual manner.
9. Fill in the drilled hole.
10. Grind down the new weld so that it is flush. Take care not to grind the chassis flange in the process.



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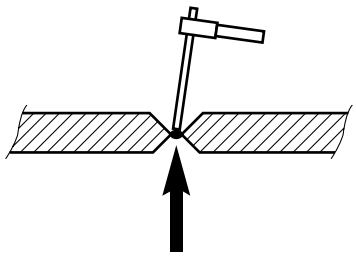

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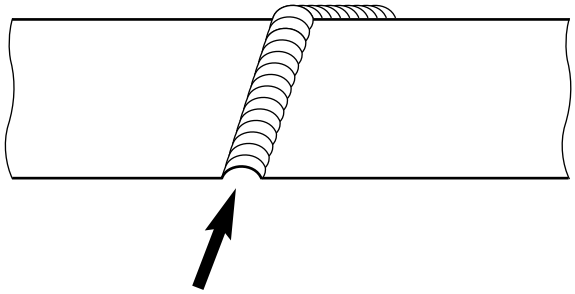
11. The beginning and end of a weld should not curve inwards (see the arrow).



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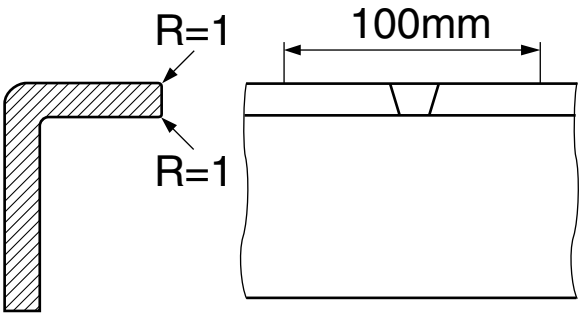
12. Round off the chassis flange at the edge of the weld.



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Straightening

Do not forget your own safety during straightening operations. When working with presses, take care that parts cannot fly out.

The straightening of a chassis demands a high degree of craftsmanship as in every case of damage, an individual assessment must be made to establish whether or not straightening would be a sensible measure.
Deformations found after accidents will mainly be of the following 6 types:

- chassis is bent sideways
- chassis has a double sideways bend ("S-bend")
- chassis sags
- chassis bulges upwards
- chassis is twisted
- chassis is out of square.

In many cases, the damage will be a combination of two or more of these basic deformations.
In general, the deformations should be dealt with in the sequence shown above, although some combinations can be dealt with in one straightening operation.
When deciding whether or not to straighten a chassis, you must consider not only the degree of chassis bending but also the angle of a bend.
If there is a sharp angular bend or fold in the chassis, the material in that area is likely to be severely deformed.
If such a chassis were to be realigned to its original form, there would be a high risk of overstretching the already weakened material and causing a crack to develop.

"Cold" straightening

The general rule for cold straightening of a chassis is that the degree to which the chassis should be forced back beyond the straight line is equal to the degree to which the chassis is bent.
For example, if a chassis is bent by 10°, the chassis should be forced back by an additional 10° beyond the straight line.
This means that in total the chassis is forced back 20°.
Cold straightening is done with forces ranging from 40 to 100 tonnes. Therefore, work as safely as possible.
Particularly when working with auxiliary tools and aids, you are advised - from a safety point of view - to attach them correctly.

"Warm" straightening
DAF chassis should not be warm straightened. Heating can cause grains in the material which will adversely affect the material properties.

General
For every straightening operation, all stresses in the stiffer parts of the chassis, for example in the tandem axle attachment cross member, should be relieved. If this is not done, these stresses will later cause new distortions or cracks in the chassis.

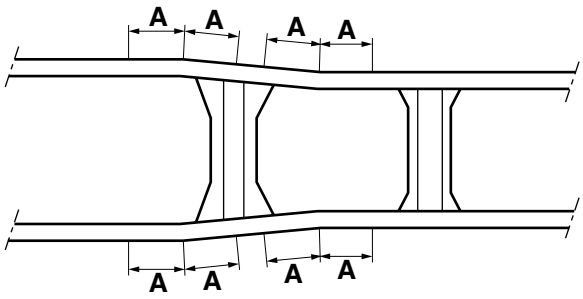
It is obvious from the above points that straightening is a highly specialised job for which the specialist involved bears full responsibility. Always contact DAF when in doubt or for complicated "straightening operations".

1.2 DRILLING IN THE CHASSIS

Note:
There are several stress zones in a chassis. Working on the chassis without proper knowledge (and not according to DAF instructions) may cause irreversible damage to the chassis. The repair shop or bodybuilder would be held fully responsible for such work and for any superstructure fitted.

If holes must be drilled in the chassis frame, note the following points:

- Drilling holes within a distance of 70 mm (distance A) from a bend in the chassis is not permitted.
- It is on no account permitted to drill holes in the tapered ends at the rear of a tractor chassis.
- Drilling holes in the flanges of the chassis side members is not permitted.
- The maximum diameter for drilled holes is 17 mm (dimension D in the drawing).
- The distance between the holes, and between the holes and the side member flange, must be at least 3xD - with a minimum of 30 mm (dimension B in the drawing).
- The distance between the lower stud hole and the chassis underside should at least be equal to distance C.
  Distance C is > 70 mm for a tractor chassis.
  Distance C is > 50 mm for all other chassis.
- Deburr (at an angle of 45°) and paint the drilled hole.



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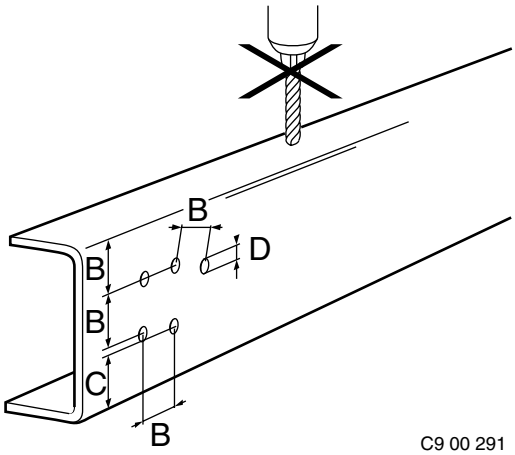

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Wheelbase alteration
Any alteration to the wheelbase or changes to the rear overhang should be done in accordance with the latest DAF Trucks Bodybuilders' Guidelines.

Note:
When using the Bodybuilders' Guidelines, you are advised to first read the "General" section.

1.3 REPLACING RIVETS BY BOLTS

Note:
A rivet may either be replaced by a flange bolt M14 x 2, property class 8.8 (DIN 6921), or a flange bolt M16 x 2, property class 10.9.

2

Removing the rivet

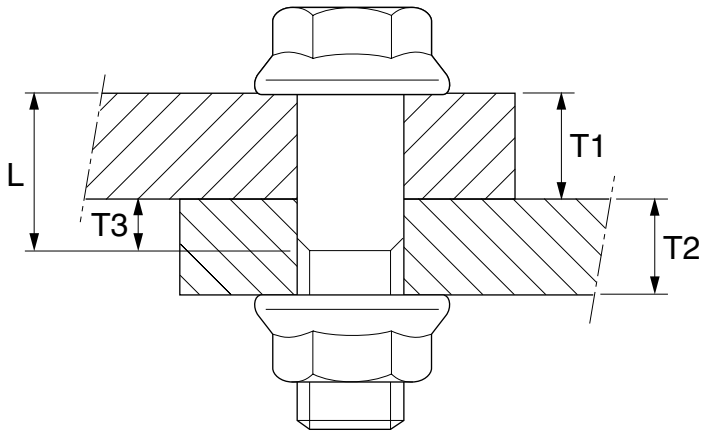
1. Remove the rivet head. Make sure not to damage the chassis during this procedure.

2. Use a 10-mm drill to drill a hole in the rivet. Remove the rivet from the chassis.

Fitting flange bolt M14

1. Ream the rivet hole to fit 14 H7 (14 + .000 - 14 + .018 mm). Make sure not to damage any lines running behind the rivet hole. Deburr the edges.

2. Repair the chassis paintwork. The new paintwork should be no thicker than 50 microns.



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3. It is important that part of the bolt shank is not threaded. Determine the length (L) of the non-threaded shank part using the formula below.

   L = T1 + T3, in which T3 must be > $^1/_2$ T2.

   L = shank length without thread
   T1 = part to be clamped
   T2 = part to be clamped

4. Tighten the flange bolt to the standard tightening torque for bolts, property class 8.8.

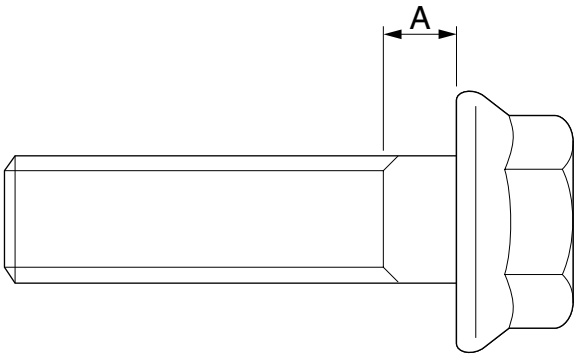
Fitting flange bolt M16

1. Drill the rivet hole out to ∅ 17 mm. Make sure not to damage any lines running behind the rivet hole. Deburr the edges.

2. Repair the chassis paintwork. The new paintwork should be no thicker than 50 microns.

3. Install a flange bolt M16 x 2, property class 10.9, with a non-threaded shank (A) of 6 mm.

4. Tighten the flange bolt to the standard tightening torque for bolts, property class 10.9.



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1. GENERAL

1.1 OPERATION OF SHOCK ABSORBER

The function of the shock absorber is twofold:

- to control the movements of chassis and superstructure in relation to the axle. Optimum comfort is achieved when the chassis and superstructure remain truly horizontal and are not subjected to any vertical accelerations when moving;
- to control the movements of the wheels on the road. Optimum handling is achieved when all wheels remain in constant contact with the road surface.

The rate of the above-mentioned movements depends on the available spring travel. The available spring travel is the difference in height between an unloaded spring and a fully loaded spring.
A well-functioning shock absorber with characteristics appropriate to the operating conditions will be the best possible compromise to fulfil the above-mentioned functions.

DAF only uses double-acting type shock absorbers.
On vehicles with air suspension, hydraulic stroke limitation is used.

The shock absorber consists of:

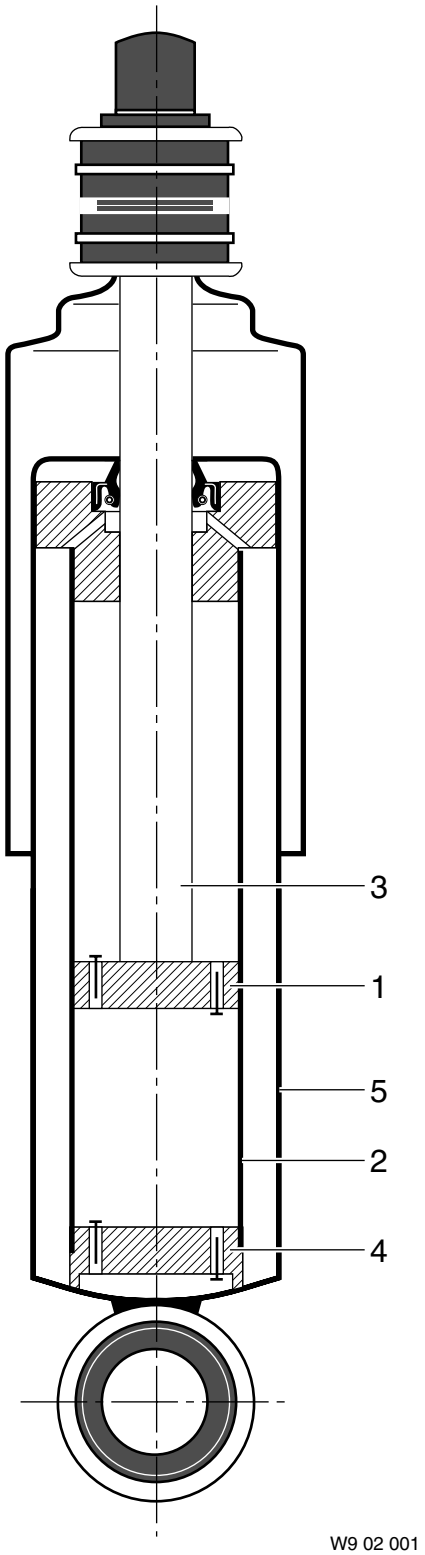
- an operating cylinder, in which the actual damping is done by a piston with piston rod of which the valve unit damps the rebound stroke;
- a bottom valve which, in combination with the piston valve unit, damps the bump stroke.
- a reservoir tube which draws in oil surplus (result of the volume taken up by the piston rod) via the bottom valve;
- a dust cover, attached to the piston rod.

3

Double-acting shock absorbers

The operation of the shock absorber is as follows:
The bump stroke moves the piston (1) down in relation to the operating cylinder (2).
Subsequently, oil flows from the bottom chamber of the piston (1) through the piston holes and valves to the top chamber where the volume increases. The oil pressure is equal on either side of the piston (1).

To compensate for the volume taken up by piston rod (3), oil flows from under the piston (1), via the bottom valve (4), to the reservoir tube (5).
The resistance met by the oil during this movement dampens the bump stroke of the shock absorber.
The rebound stroke moves the piston (1) up in relation to the operating cylinder (2).
Subsequently, pressure is exerted on the oil in the upper chamber of the piston (1) causing the oil to flow through the piston holes and valves to the bottom chamber under piston (1).
The resistance met by the oil during this movement dampens the rebound stroke of the shock absorber.
To compensate for the volume taken up by the piston rod (3) in the upper chamber, oil flows via bottom valve (4) from the reservoir tube (5) to the bottom chamber under the piston (1).



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2. REMOVAL AND INSTALLATION

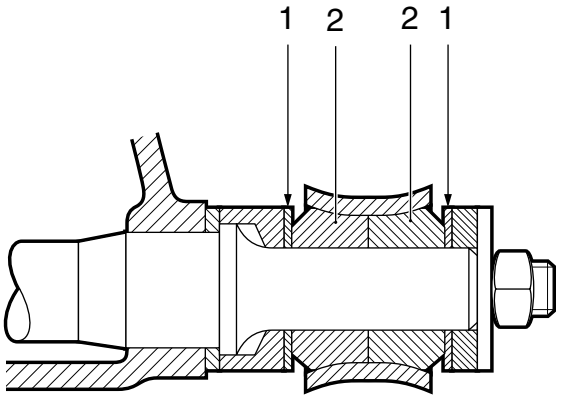
2.1 REMOVAL AND INSTALLATION, SHOCK ABSORBER

Removing shock absorber

1. Remove the attachment nuts and/or bolts.
2. Mark the exact positions and location of the mounting rubbers.
3. Remove the shock absorber from under the vehicle.

Installing shock absorber

1. Check the shock absorber mountings for hairline cracks.
2. If the old rubbers are to be reused, check them for hairline cracks and ageing. Install the rubbers in the original locations and positions.
3. When replacing the rubbers, use only the specified types.
4. When installing the shock absorbers on a leaf-sprung trailing axle, bearing rings (1) have to be used with the treated (blackened) side facing away from the shock absorber rubbers (2).
5. Replace the self-locking nuts. Tighten the attachment bolts to the specified torque. See "Technical data".



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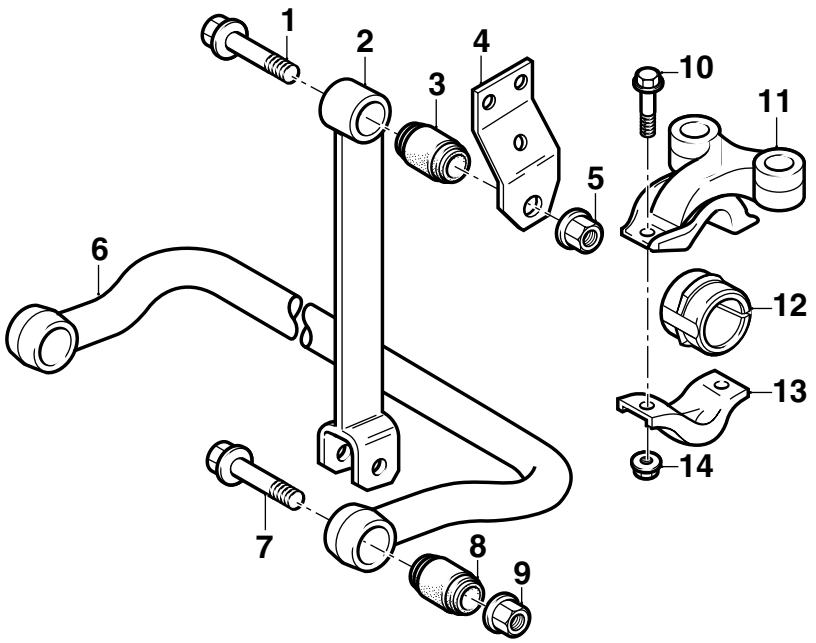
4

© 200448

1. GENERAL

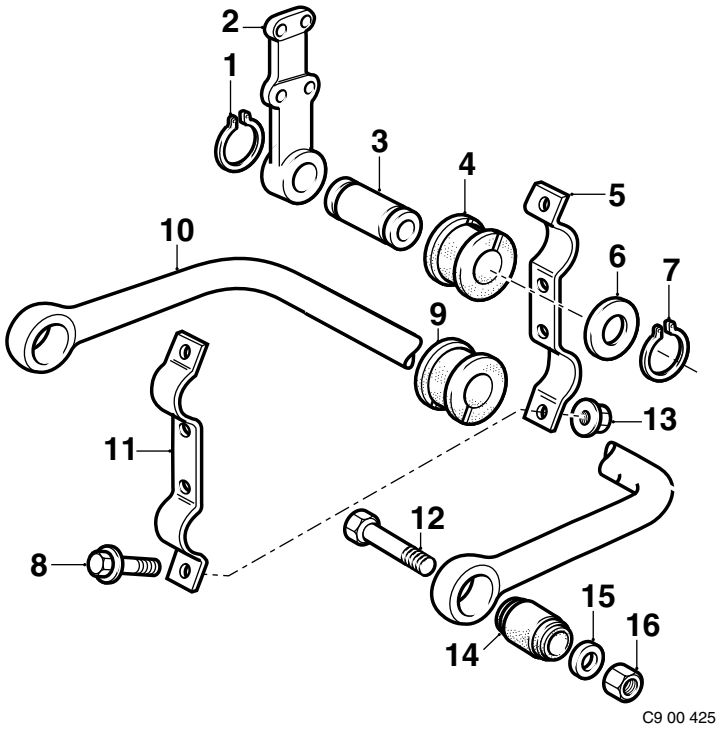
1.1 OVERVIEW DRAWING, FRONT AXLE STABILISER



C9 00 292

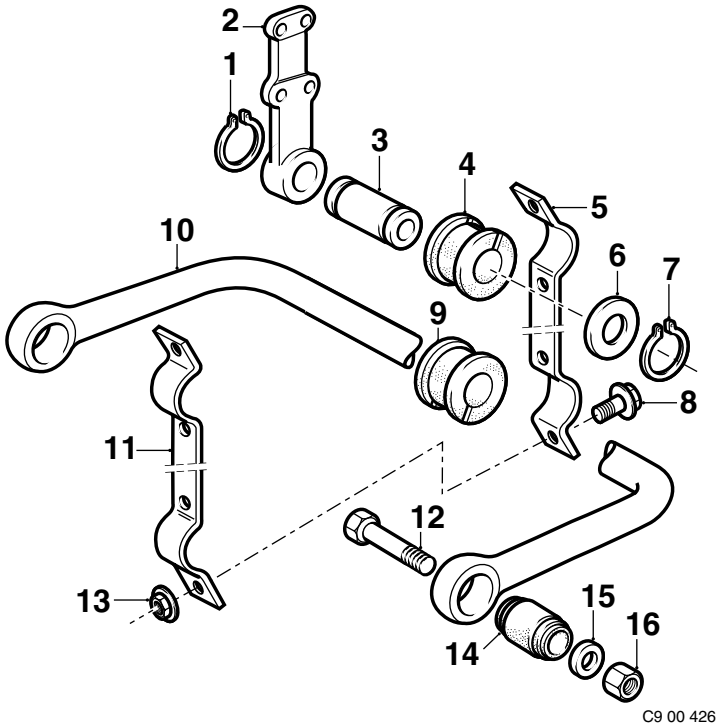
1. Flange bolt
2. Shackle
3. Silentblock
4. Bracket
5. Flange nut
6. Stabiliser bar
7. Flange bolt
8. Silentblock
9. Flange nut
10. Flange bolt
11. Bracket
12. Bearing bush
13. Bearing bush cover
14. Flange nut

1.2 OVERVIEW DRAWING, LEAF-SPRUNG REAR AXLE STABILISER



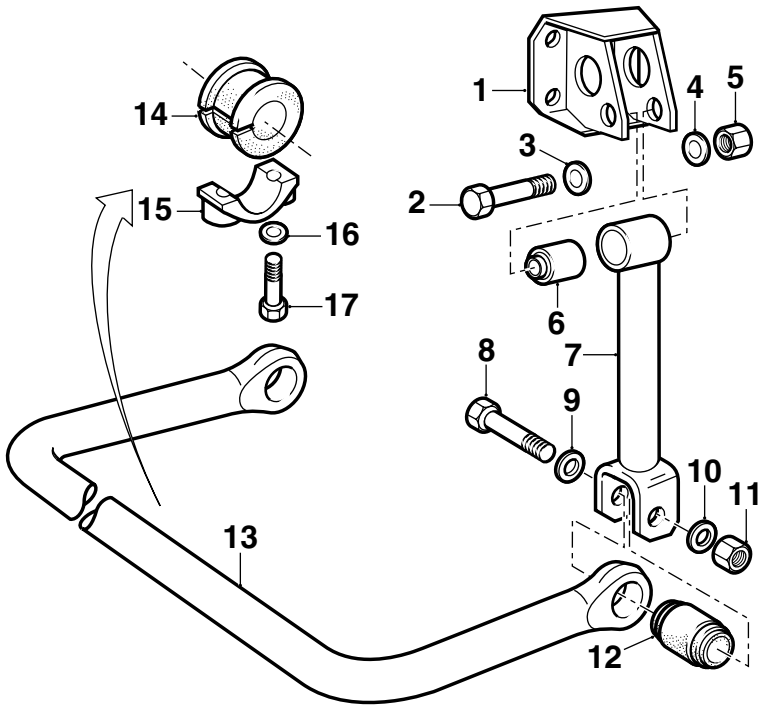
1. Circlip
2. Bracket
3. Axle
4. Bearing bush
5. Bracket
6. Ring
7. Circlip
8. Flange bolt
9. Bearing bush
10. Stabiliser bar
11. Bracket
12. Attachment bolt
13. Attachment nut
14. Silentblock
15. Ring
16. Attachment nut

1.3 OVERVIEW DRAWING, STABILISER OF LEAF-SPRUNG TRAILING AXLE AND PARABOLIC LEAF-SPRUNG TANDEM AXLE



1. Circlip
2. Bracket
3. Axle
4. Bearing bush
5. Bracket
6. Washer
7. Circlip
8. Flange bolt
9. Bearing bush
10. Stabiliser bar
11. Bracket
12. Attachment bolt
13. Attachment nut
14. Silentblock
15. Ring
16. Attachment nut

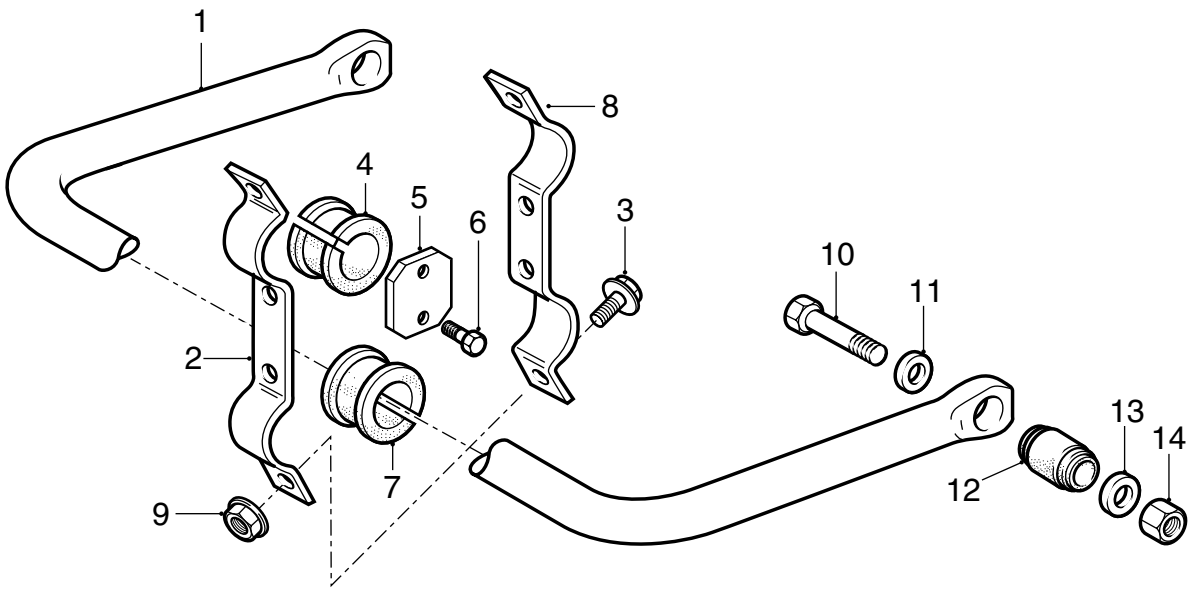
1.4 OVERVIEW DRAWING, AIR-SPRUNG REAR AXLE STABILISER



C9 00 309

1. Bracket
2. Attachment bolt
3. Ring
4. Ring
5. Attachment nut
6. Silentblock
7. Shackle
8. Attachment bolt
9. Ring
10. Ring
11. Attachment nut
12. Silentblock
13. Stabiliser bar
14. Bearing bush
15. Bearing bush cover
16. Ring
17. Attachment bolt

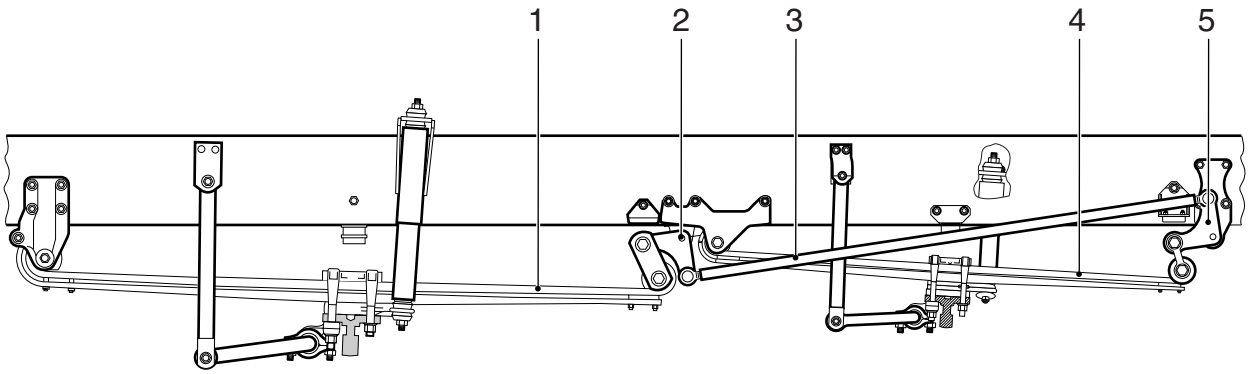
1.5 OVERVIEW DRAWING, LEADING REAR AXLE STABILISER



C9 00 313

1. Stabiliser bar
2. Bracket
3. Attachment bolt
4. Bearing bush
5. Locking plate
6. Attachment bolt
7. Bearing bush
8. Bracket
9. Attachment nut
10. Attachment bolt
11. Ring
12. Silentblock
13. Ring
14. Attachment nut

1.6 DESCRIPTION OF AXLE LOAD COMPENSATION DEVICE



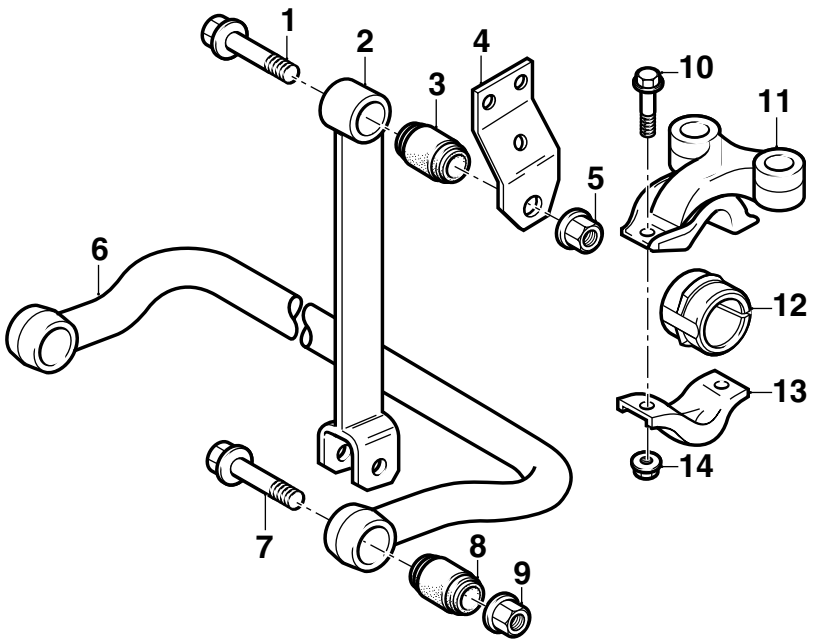
C9 00 503

4

Vehicles equipped with a double front axle are fitted with an axle load compensation device.
The axle load compensation device ensures that the vehicle weight is distributed evenly over both front axles.
Via the shackle (2), rod (3) and shackle (5) force is transferred from the front spring assembly (1) to the rear spring assembly (4) and vice versa.

2. REMOVAL AND INSTALLATION

2.1 REMOVAL AND INSTALLATION, FRONT AXLE STABILISER



C9 00 292

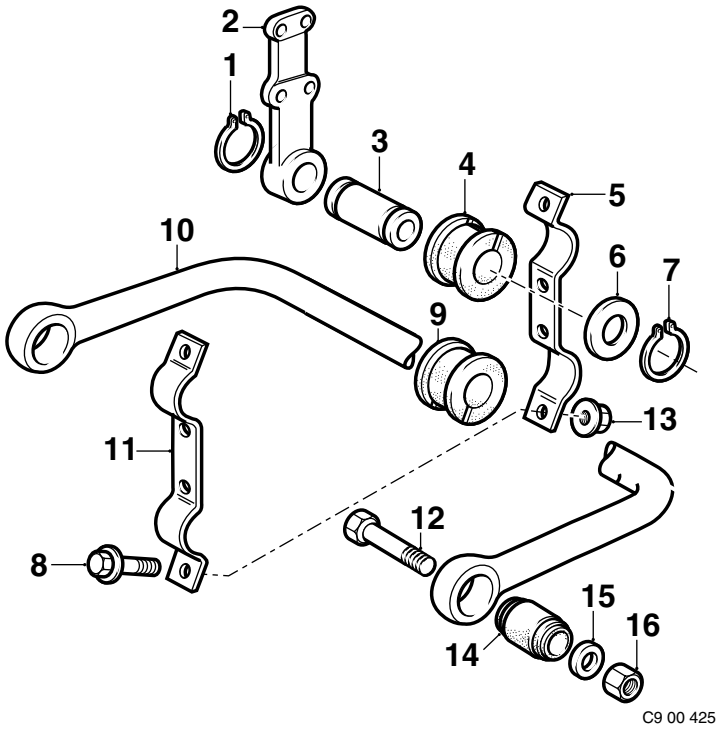
Removing front axle stabiliser

1. Remove the bearing bush covers (13).
2. Remove the attachment bolts (7).
3. Remove the stabiliser bar (6) from under the vehicle.
4. Remove the bearing bushes (12) from the stabiliser bar (6).
5. Remove the attachment bolts (1) and the shackles (2).

Installing front axle stabiliser

1. Check the condition of the silentblocks (3) and (8) and the bearing bushes (12).
2. Fit the shackles (2).
3. Turn the bearing bush (12) so that the edges come to rest in the support (11) and the bearing bush cover (13).
4. Fit the bearing bush covers (13).
5. Install the stabiliser bar (6) in the shackles (2).
6. Fit the attachment bolts (7) with the heads facing towards the chassis.
7. Tighten the attachment bolts (1), (7) and (10) to the specified torque, see "Technical data".

2.2 REMOVAL AND INSTALLATION, LEAF-SPRUNG REAR AXLE STABILISER



Removing leaf-sprung rear axle stabiliser

1. Remove the brackets (5) and (11).
2. Remove the attachment bolts (12).
3. Remove the stabiliser bar (10) from under the vehicle.
4. Remove the bearing bushes (9) from the stabiliser bar (10).
5. Remove the circlip (7) with the washer (6) and remove the bearing bush (4) from the axle (3).

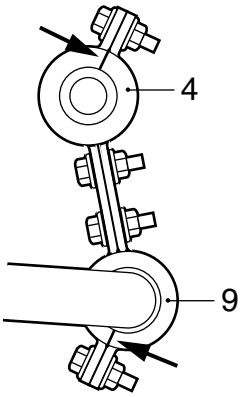
Installing leaf-sprung rear axle stabiliser

1. Check the condition of the silentblock (14) and the bearing bushes (4) and (9).
2. Fit the bearing bushes (4), using new circlips (7).
3. Fit the bearing bushes (9) to the stabiliser bar (10).

4. Turn the bearing bushes (4) and (9) into the indicated position.

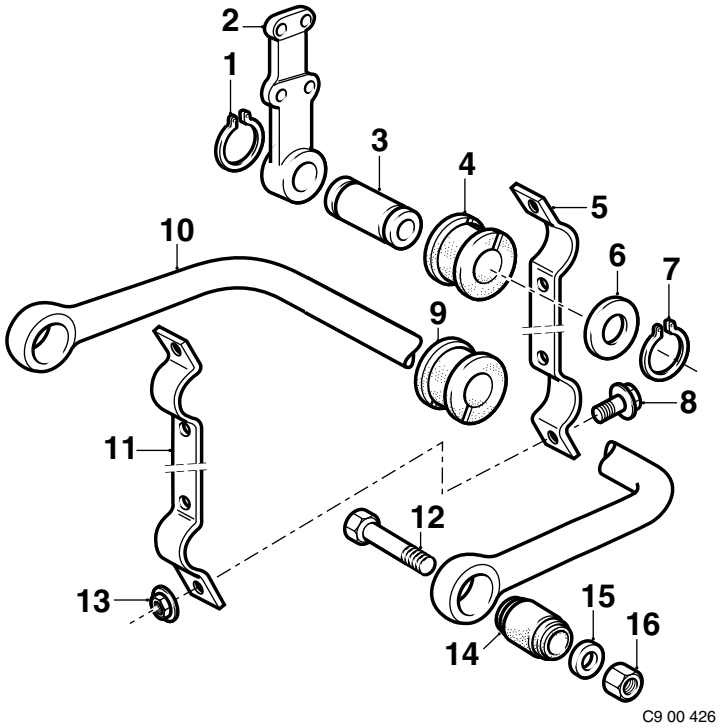
5. Fit the brackets (5) and (11). Fit the attachment bolts (8) with the heads facing towards the front of the vehicle and tighten the bolts (8) to the specified torque, see "Technical data".

6. Fit the attachment bolts (12) with the heads facing towards the chassis.



C9 00 310

2.3 REMOVAL AND INSTALLATION, STABILISER OF LEAF-SPRUNG TRAILING AXLE AND PARABOLIC LEAF-SPRUNG TANDEM AXLE



Removing stabiliser of leaf-sprung trailing axle and parabolic leaf-sprung tandem axle

1. Remove the brackets (5) and (11).
2. Remove the attachment bolts (12).
3. Remove the stabiliser bar (10) from under the vehicle.
4. Remove the bearing bushes (9) from the stabiliser bar (10).
5. Remove the circlip (7) with the washer (6) and remove the bearing bush (4) from the axle (3).

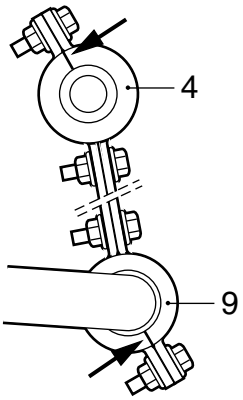
Installing stabiliser of leaf-sprung trailing axle and parabolic leaf-sprung tandem axle

1. Check the condition of the silentblock (14) and the bearing bushes (4) and (9).
2. Fit the bearing bushes (4), using new circlips (7).
3. Fit the bearing bushes (9) to the stabiliser bar (10).

4. Turn the bearing bushes (4) and (9) into the indicated position.

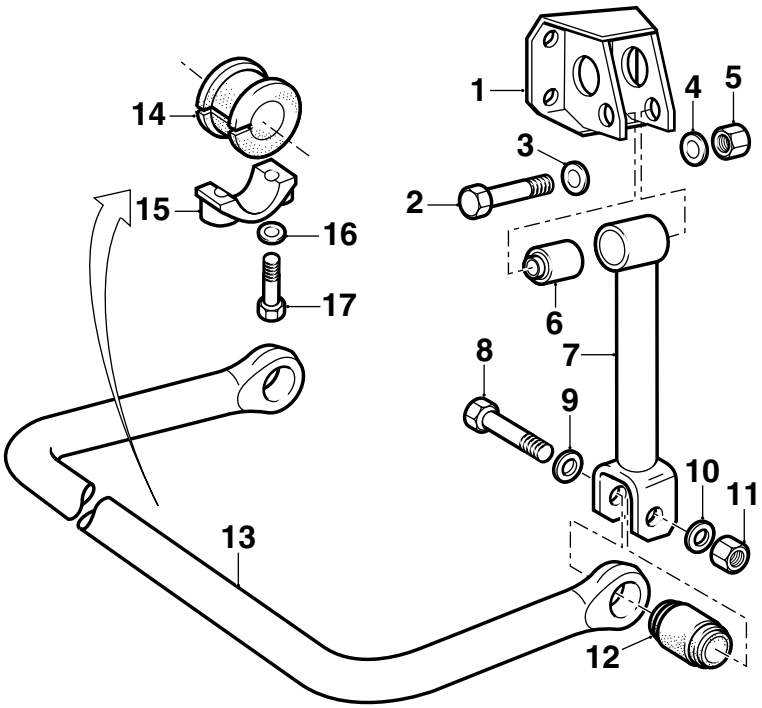
5. Fit the brackets (5) and (11). Fit the attachment bolts (8) with the heads facing towards the rear of the vehicle and tighten the bolts (8) to the specified torque, see "Technical data".

6. Fit the attachment bolts (12) with the heads facing towards the chassis.



C9 00 360

2.4 REMOVAL AND INSTALLATION, AIR-SPRUNG REAR AXLE STABILISER



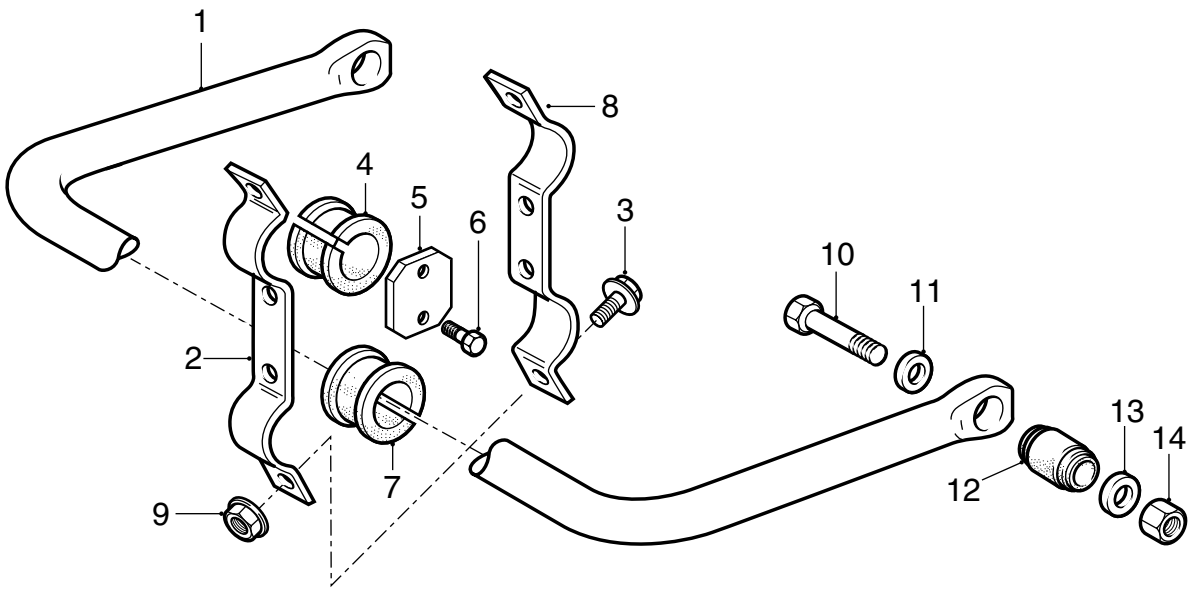
Removing air-sprung rear axle stabiliser

1. Remove the bearing bush covers (15).
2. Remove the attachment bolts (8).
3. Remove the stabiliser bar (13) from under the vehicle.
4. Remove the bearing bushes (14) from the stabiliser bar (13).
5. Remove the attachment bolts (2) and remove the shackle (7) from the bracket (1).

Installing air-sprung rear axle stabiliser

1. Check the condition of the bearing bush (14) and the silentblocks (6) and (12).
2. Fit the shackle (7).
3. Turn the bearing bushes (14) such that the opening is located at the contact surface of the bearing cover.
4. Fit the bearing bush covers (15). Evenly tighten the attachment bolts (17).
5. Fit the attachment bolts (8) with the heads facing towards the chassis.

2.5 REMOVAL AND INSTALLATION, LEADING REAR AXLE STABILISER



C9 00 313

Removing leading rear axle stabiliser

1. Remove the brackets (2) and (8).
2. Remove the attachment bolts (10).
3. Remove the stabiliser bar (1) from under the vehicle.
4. Remove the bearing bushes (7) from the stabiliser bar (1).
5. Remove the locking plate (5) and remove the bearing bush (4) from the axle.

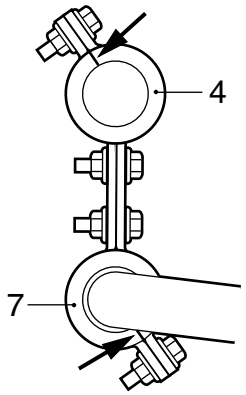
Installing leading rear axle stabiliser

1. Check the condition of the silentblock (12) and the bearing bushes (4) and (7).
2. Fit bearing bush (4), using the locking plate (5). Tighten the attachment bolts (6) to the specified torque. See "Technical data".
3. Fit the bearing bushes (7) to the stabiliser bar (1).

4. Turn the bearing bushes (4) and (7) into the indicated position.

5. Fit the brackets (2) and (8). Fit the attachment bolts (3) with the heads facing towards the rear of the vehicle and tighten the bolts (3) to the specified torque, see "Technical data".

6. Fit the attachment bolts (10) with the heads facing towards the chassis.



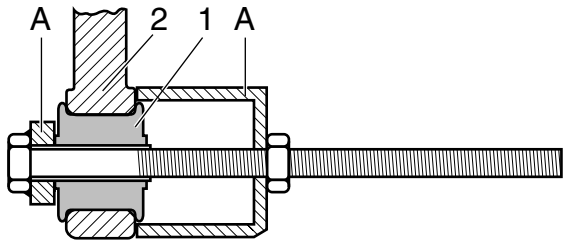
C9 00 312

2.6 REMOVAL AND INSTALLATION, SILENTBLOCK WITH RUBBER CASING

Note:
- The silentblocks for the stabiliser bar and the stabiliser bar shackle are identical to one another.
- The silentblocks have to be fitted using special tool (DAF no. 1310476). It is not possible to install the silentblocks undamaged, without using this puller.
- The stabiliser bar does not have to be removed when replacing the silentblocks on the stabiliser bar.

Removing silentblock with rubber casing

1. Force the silentblock (1) - using the puller (A), special tool (DAF no. 1310476) - from the stabiliser bar (2) or the stabiliser bar shackle (2).
   Before fitting the puller, apply a lubricant to the contact surface of the puller or the silentblock, for example tyre grease or a soap solution.



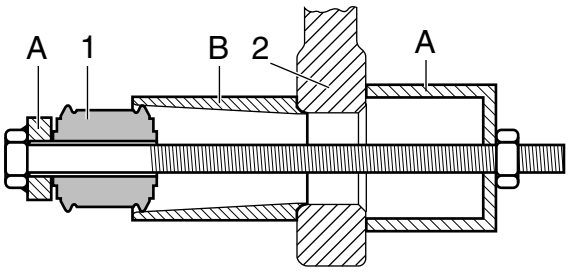
C9 00 308

Installing silentblock with rubber casing

1. Apply plenty of lubricant to the outer circumference of the new silentblock (1) and the contact surface of the puller or the silentblock, for example tyre grease. Never apply any grease or oil product to the new silentblock.

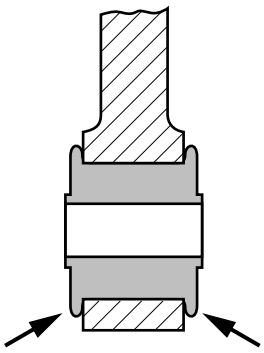
2. Place the guide sleeve (B), which forms part of the puller, on the stabiliser bar or the shackle.

3. Place the new silentblock (1) on guide sleeve (B) and pull the silentblock (A) into the stabiliser bar (2) or the shackle (2) using puller (A), special tool (DAF no. 1310476).



C9 00 135

4. Pull the silentblock into the eye until the collar of the silentblock has been pulled fully through the eye.
Remove the guide sleeve (B) and, if necessary, slightly force the silentblock backwards so that the collars of the silentblock protrude from both sides of the stabiliser bar or the shackle. See arrows in drawing.



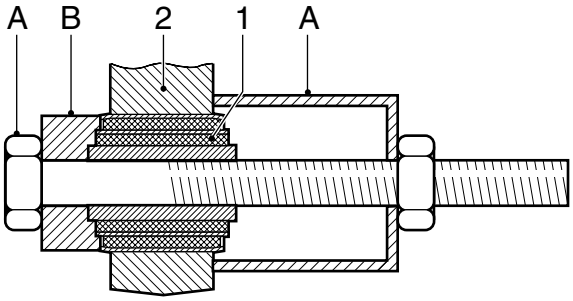
C9 00 307

2.7 REMOVAL AND INSTALLATION, SILENTBLOCK WITH STEEL CASING

Note:
- The silentblocks with steel casing should be fitted using special tool (DAF no. 1310479). It is not possible to install the silentblocks undamaged, without using this puller.
- The stabiliser bar does not have to be removed when replacing the silentblocks.

Removing silentblock with steel casing

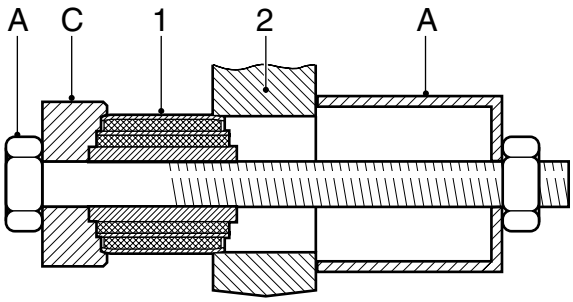
1. Fit the thrust piece with the smallest diameter (B in the drawing) on the puller (A), special tool (DAF no. 1310479).
2. Apply a lubricant to the thrust piece, for example tyre grease, and fit the puller.
3. Using the puller, force the silentblock from the stabiliser bar.



C9 00 149

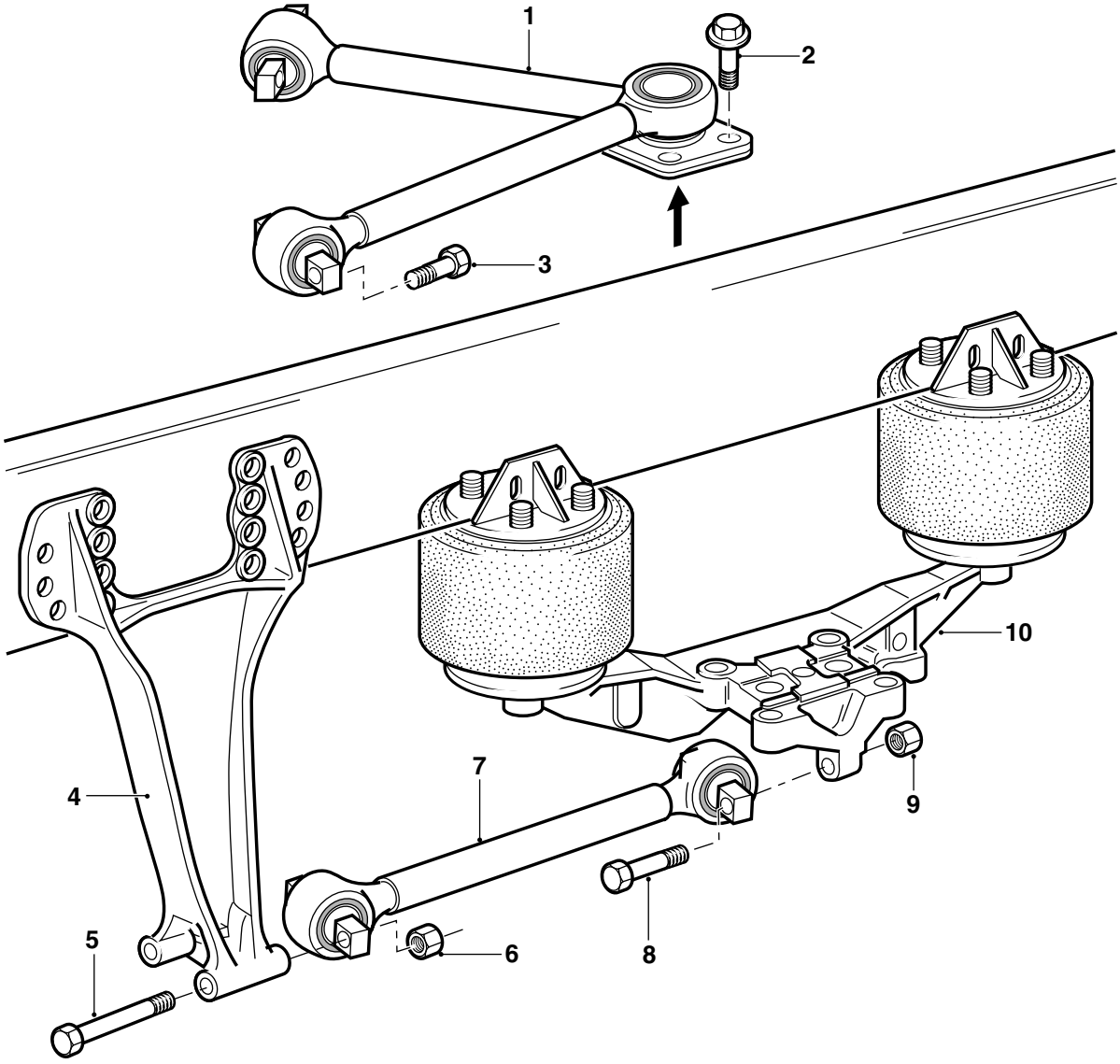
Installing silentblock with steel casing

1. Place the thrust piece with the largest diameter (C in the drawing) on the puller (A).
2. Apply for example tyre grease to the thrust piece, and place the puller (A) with the silentblock (1) on the stabiliser bar (2).
3. Force the silentblock into the stabiliser bar using the puller. The thrust piece (C) must just touch the stabiliser bar.
4. Check whether the two sides of the silentblock protrude equally out of the stabiliser bar.



C9 00 150

2.8 REMOVAL AND INSTALLATION, TRIANGULAR LINK AND AIR-SPRUNG REAR AXLE TORQUE RODS



C900299

Removing triangular link

1. Remove the attachment bolts (2).

2. Remove the attachment bolts (3) and remove the torque rod (1). This can only be done by two persons working together.

Installing triangular link

1. Before installation, check the rubber bushes of the triangular link and the silentblock for hairline cracks and wear.
   Check to see if the contact surface of the triangular link flange (1) (see arrow) and the contact surface on the axle housing are free from grease and paint.

2. Install the triangular link (1) to the vehicle. This can only be done by two persons working together. Fit the attachment bolts (2) and (3).
   Tighten the attachment bolts (2) evenly to the specified torque. See "Technical data".

Removing torque rod

1. Remove the attachment bolts (5) and (8) and remove the torque rod (7).

Installing torque rod

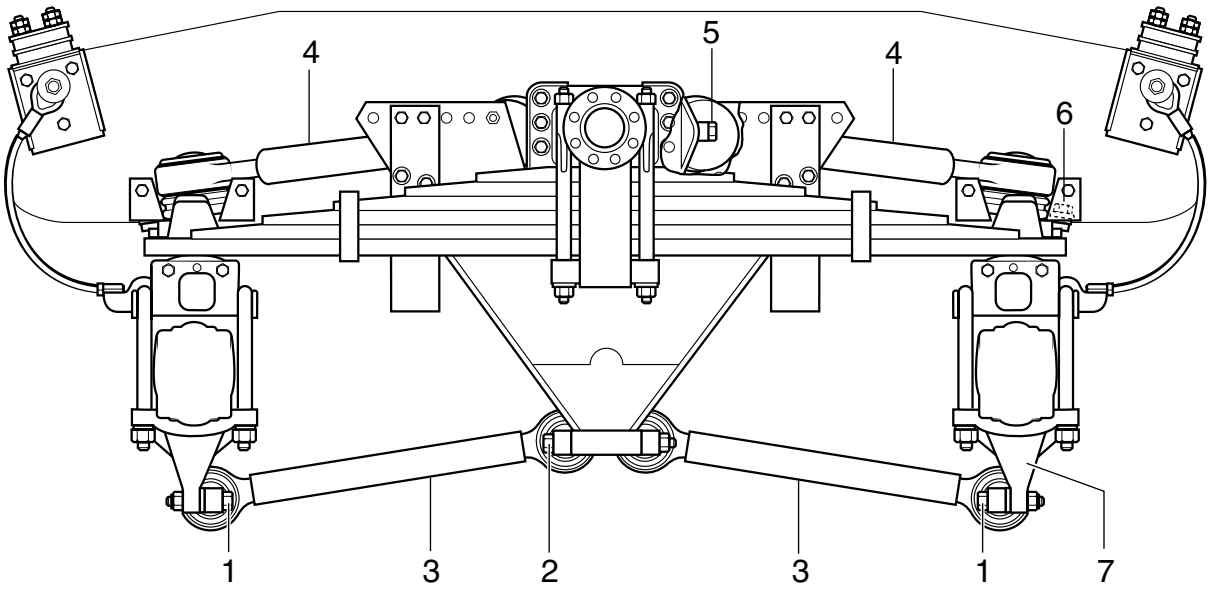
1. Before installation, check the rubber bushes of the torque rod (7) for hairline cracks and wear.

2. Clean the contact surfaces if necessary. These should be free from dirt and grease.

3. Fit the torque rod (7) between the torque rod bracket (4) and the yoke (10).

4. Fit the attachment bolts (5) and (8) with the heads facing towards the front of the vehicle. Secure the attachment bolts (5) and (8).

2.9 REMOVAL AND INSTALLATION, TRIANGULAR LINK AND TANDEM AXLE TORQUE RODS



w9 03 011

If the triangular link and torque rods are removed from an axle, the axle should be adequately supported to prevent it from tipping over.

Removing triangular link

1. Remove the attachment bolts (6).
2. Remove the attachment bolts (5) and remove the triangular link (4). This can only be done by two persons working together.

Installing triangular link

1. Before installation, check the rubber bushes of the triangular link for hairline cracks and wear. Check if the contact surface of the triangular link flange and the contact surface on the axle housing are free from grease and paint.
2. Install the triangular link (4). This will take two persons working together. Fit the attachment bolts (5) and (6) and secure the bolts (5).
3. Tighten the attachment bolts (6) evenly to the specified torque. See "Technical data".

Removing torque rod

1. Remove the attachment bolts (1) and (2) and remove the torque rod (3).

Installing torque rod

1. Before installation, check the rubber bushes of the torque rod (3) for hairline cracks and wear.

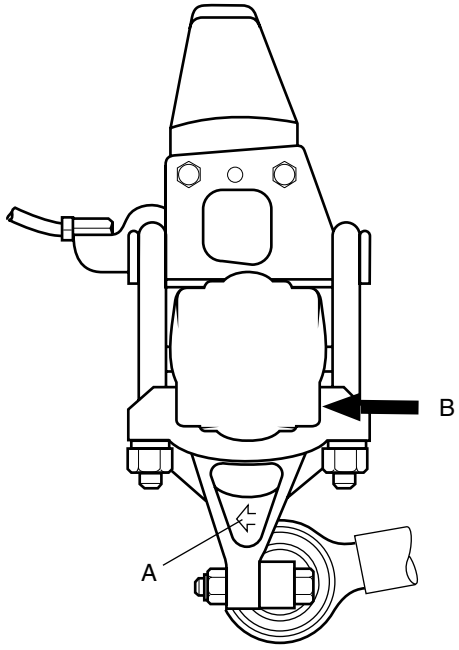
2. Clean the contact surfaces if necessary. These should be free from dirt and grease.

3. Install the torque rod (3) between the brackets.

   Note:
   If torque rod bracket (7) has been removed, it must be reinstalled with the arrow (A) on the bracket pointing in the driving direction.

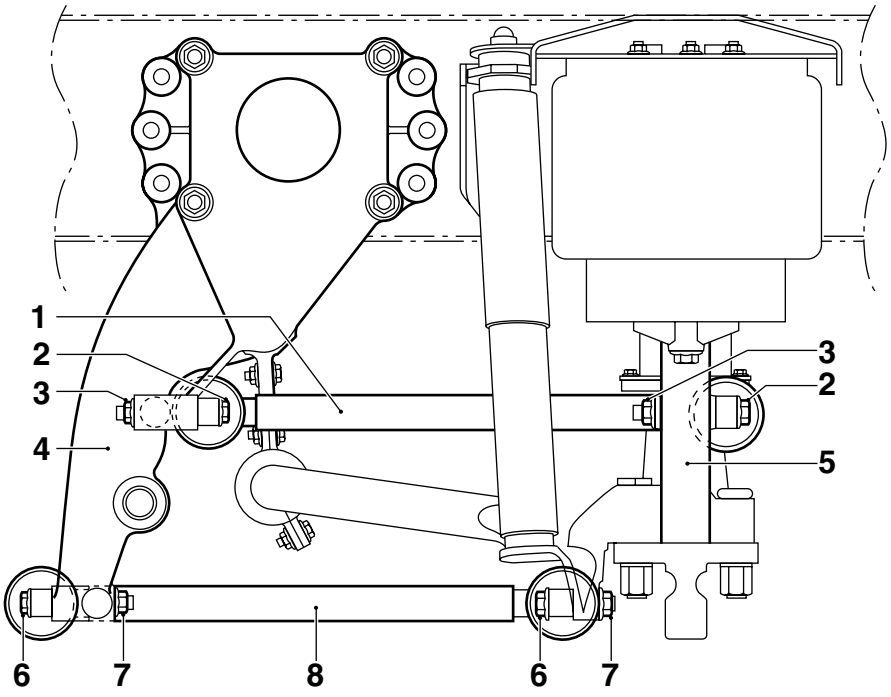
   If there were any filler plates (B) previously between the torque rod bracket and the axle housing, they must be returned to the same position. The clearance between axle housing and bracket should not exceed 0.5 mm.

4. Secure the attachment bolts (1).



w9 03 008

2.10 REMOVAL AND INSTALLATION, LEADING REAR AXLE TORQUE RODS



C9 00 389

Removing upper torque rod

1. Remove both attachment bolts (2) and remove the torque rod (1).

Installing upper torque rod

1. Before installation, check the rubber bushes of the torque rod (1) for hairline cracks and wear.

2. Clean the contact surfaces if necessary. These should be free from dirt and grease.

3. Fit the torque rod (1) as shown.

4. Fit the attachment bolts (2) with the heads facing towards the rear of the vehicle. Tighten the attachment bolts to the specified torque. See "Technical data".

Removing lower torque rod

1. Remove both attachment bolts (6) and remove the torque rod (8).

Installing lower torque rod

1. Before installation, check the rubber bushes of the torque rod (8) for hairline cracks and wear.

2. Clean the contact surfaces if necessary. These should be free from dirt and grease.

3. Fit the torque rod (8) as shown.

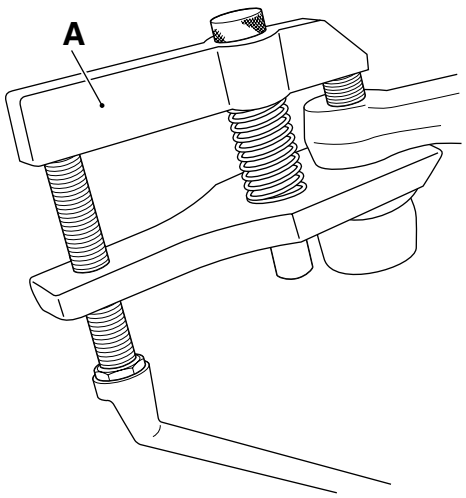
4. Fit the attachment bolts (6) with the heads facing towards the front of the vehicle. Tighten the attachment bolts to the specified torque. See "Technical data".

2.11 REMOVAL AND INSTALLATION, AXLE LOAD COMPENSATION DEVICE ROD

Removing axle load compensation device rod

1. Remove the ball end nuts on both sides of the rod. Self-locking nuts must not be reused.

2. Remove the ball ends from the shackles using a ball end puller (A).



S7 00 555

Installing axle load compensation device rod

1. Check the balls of the rod for wear and damage.

2. Check the ball end thread for damage before fitting a new self-locking nut. To do so, hand-tighten a new non-self-locking nut on the ball end to be checked. If the new nut cannot be fully hand-screwed onto the entire thread, the ball end must be replaced.

Fitting a new self-locking nut to a ball end with a damaged thread may lead to dangerous situations.

3. Clean the tapered contact surfaces of both the balls and the shackles. The tapered surfaces should be absolutely free from dirt, grease and paint.

4. Fit the rod.

It is not allowed to fit a self-locking nut to a ball end with split-pin hole.

5. In the case of self-locking nuts, use new self-locking nuts.
   Tighten the ball end nuts to the specified torque. See "Technical data".
   In the case of a castle nut, if the ball end split-pin hole does not match the recesses in the castle nut, the castle nut should be tightened further.

6. In the case of castle nuts, secure them with new split pins.

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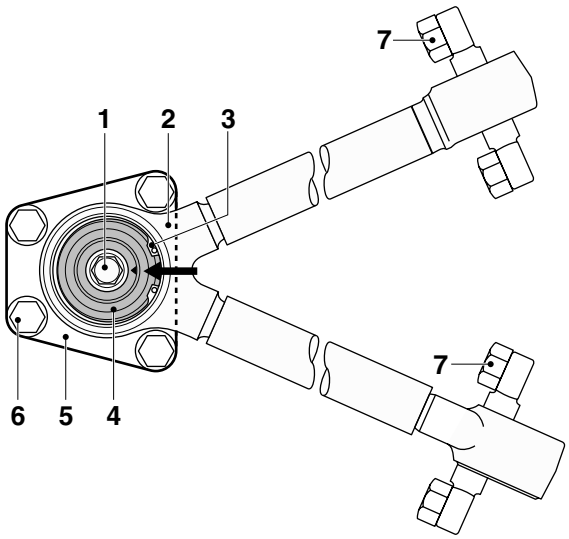
3. DISASSEMBLY AND ASSEMBLY

3.1 DISASSEMBLY AND ASSEMBLY, SILENTBLOCK OF TRIANGULAR LINK

Disassembling silentblock of triangular link

1. Loosen the attachment bolts (7) a few turns.
2. Remove the attachment bolt (1).
3. Screw an M24 x 1.5 bolt into the silentblock (4). This will remove the triangular link (2) from the tapered attachment pin. If the triangular link (2) cannot be removed, the flange (5) must be removed from the axle housing and be forced from the triangular link (2) using a pressing tool.
4. Remove the attachment bolts (7). Remove the triangular link from under the vehicle. This can only be done by two persons working together.
5. Remove the circlip (3).
6. Remove the silentblock (4) from the triangular link (2) using a pressing tool. Make sure that the tool rests on the outer rim of the silentblock (4).



C9 00 300

Assembling silentblock of triangular link

1. Clean the chamber in the triangular link (2).
2. Remove all rust and grease from the tapered part of the flange (5).
3. Apply a thin layer of acid-free petroleum jelly to the circumference of the new silentblocks (4).
4. Position the new silentblock (4) such that the marking (see arrow) is positioned in between the torque rods as indicated.

5. Force the silentblock (4) into the triangular link (2). Make sure that the tool rests on the outer rim of the silentblock (4).

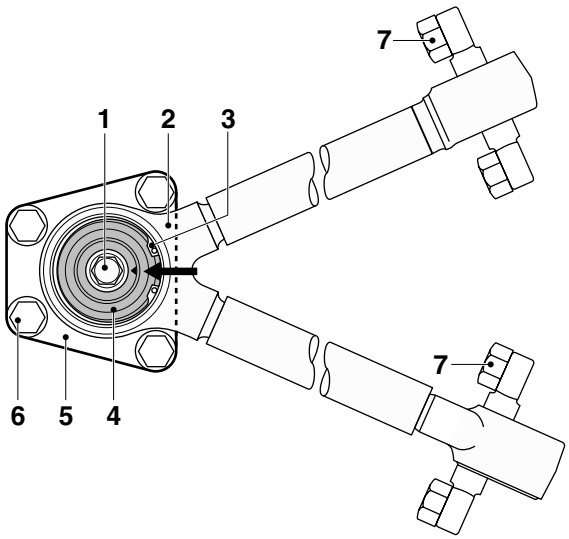
6. Fit the circlip (3) as indicated. Make sure that the entire circlip (3) is positioned correctly in the groove.

7. Install the flange (5), if it was removed, on the axle housing. Check to see if the contact surface of the flange (5) and the contact surface on the axle housing are free from grease and paint. Tighten the attachment bolts (6) to the specified torque. See "Technical data".

8. Install the triangular link (2) under the vehicle. This will take two persons working together. Tighten the attachment bolts (7) by hand.

9. Fit the attachment bolt (1). Tighten the attachment bolt (1) to the specified torque. See "Technical data".

10. Secure the attachment bolts (7).



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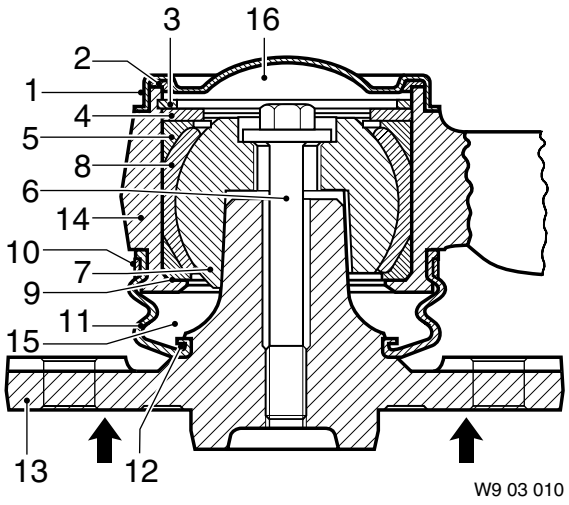
3.2 DISASSEMBLY AND ASSEMBLY, BALL JOINT OF TRIANGULAR LINK

Disassembling ball joint of triangular link

1. Carefully grind away the tack welds on the cover (1) and remove the cover and felt ring (2).
2. Remove the circlip (3), the steel washer (4) and the triangular shim (5).
3. Remove the attachment bolt (6).
4. Screw an M20 x 1.5 bolt into the ball (7). This will drive the ball and the ball socket (8) out of the housing (14).
5. Remove the triangular shim (9).
6. Remove the clamping strip (10) from the gaiter (11). The torque rod can now be separated from the pin.
7. Remove the spring (12) to replace the gaiter (11).



Note:
It is not necessary to take the ball out of the housing if only the gaiter (11) needs to be replaced.
Remove the attachment bolt (6) and the clamping strip (10).
By screwing an M20 x 1.5 bolt into ball (7), the torque rod is separated from the flange (13), and the gaiter can be replaced.

Assembling ball joint of triangular link

1. Before assembly, thoroughly clean all parts to be reused.
2. Fit the gaiter (11) with the spring (12) onto the flange (13). Repack the gaiter (space 15) with approx. 125 cm^3 of grease.
3. Fit the triangular shim (9).
4. Grease the ball (7) and the ball socket (8) and insert them into the housing (14).

5. Then fit the triangular shim (5), the steel washer (4) and the circlip (3), in this order. Make sure that circlip (3) is correctly fitted in the groove of the housing.

6. Fit the ball (7) which is installed in the housing onto the pin of the flange (13), using the attachment bolt (6). Tighten the attachment bolt (6) to the specified torque. See "Technical data".

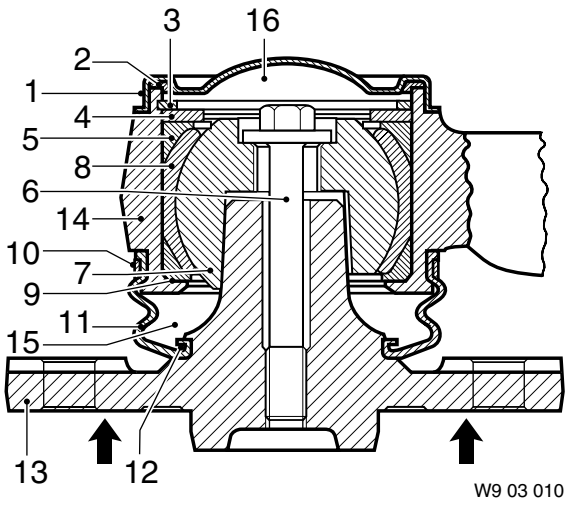
7. Attach the gaiter (11) to the housing (14) using the clamping strip (10).

8. Pack the space on top of the ball (space 16) with approx. 35 cm^3 of grease.

9. Carefully tap the cover (1) and the felt ring (2) into place with a nylon mallet.

10. Secure the cover with tack welds (3).

Note:
When the flange (13) has been removed and repainted, the contact surface of the flange (see arrows in drawing) should be made free of paint before the flange is reinstalled.



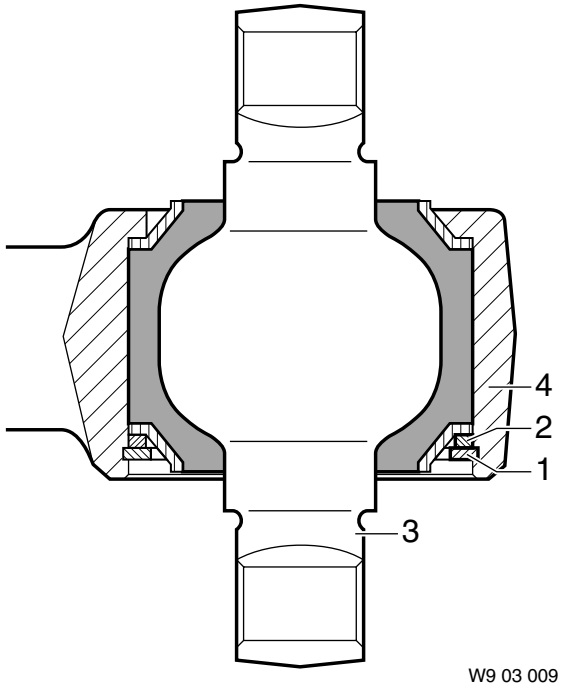
3.3 DISASSEMBLY AND ASSEMBLY, MOUNTING RUBBERS

Disassembling mounting rubber

1. Remove the circlip (1) and, if fitted, the shim (2).
2. Drive the pin and rubber bush unit (3) from the torque rod housing (4).

Assembling mounting rubber

1. Apply a thin film of acid-free petroleum jelly or tyre grease to the rubber.
2. Push the pin (3) into the housing (4). Make sure that the bolt holes are parallel with the torque rod.
3. Fit the shim (2) (if removed earlier).



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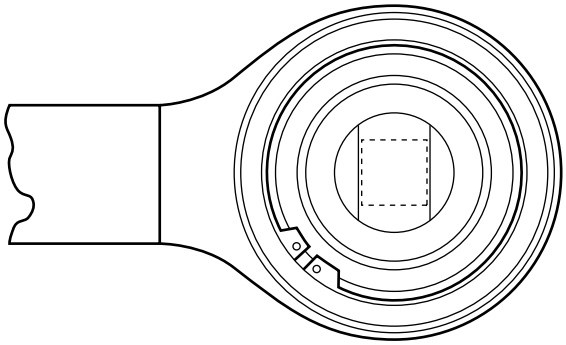
4. Fit the circlip (1) as indicated. Ensure that the circlip (1) is correctly fitted into the groove of the housing.



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1. SAFETY INSTRUCTIONS

1.1 SAFETY INSTRUCTIONS

Spring leaves
- Spring leaves should not be subjected to blasting. Blasting will cause indentations in the leaf spring which could initiate pitting corrosion.
- Corrosion should be prevented as this will considerably shorten the service life of the spring.
- Any type of damage should be prevented. Damage will considerably shorten the service life.
- Spring leaves should not be heated.
- Bear this in mind when welding on the vehicle. Take precautionary measures against weld and fire damage (notching effect).
- Never hit a parabolic spring leaf with a hammer. This could cause the leaf to break.
- Never replace a single broken leaf within a spring assembly, because this will substantially shorten the service life of the other spring leaves.

Spring brackets
Spring brackets should be removed, if:
- there is doubt about the dimensional accuracy after having been subjected to a heavy load (e.g. a collision). The spring bracket should be magnaflux tested.
  If cracks are detected, the spring bracket should be replaced. If it is not possible to magnaflux test the spring bracket, the spring bracket should always be replaced.
- such a degree of wear has occurred that it must be replaced.

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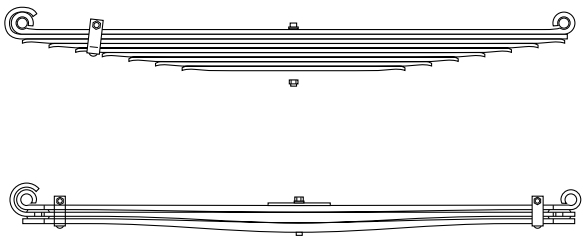
2. GENERAL

2.1 DESCRIPTION OF LEAF SUSPENSION

DAF uses two different types of leaf spring assemblies on its vehicles: parabolic and trapezoidal leaf spring assemblies. The trapezoidal leaf spring assemblies only come with the driven tandem axle.

The trapezoidal leaf spring assembly consists of a number of spring leaves of different lengths, fitted on top of each other.



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The parabolic leaf spring assembly, which has fewer spring leaves than the trapezoidal leaf spring assembly, consists of several spring leaves of equal length whereby the thickness of each leaf follows a parabolic curve in relation to its length.
Except at the centre clamping and at the spring leaf ends, the spring leaves of a parabolic leaf spring assembly should not come into contact. To that end spacer plates have been fitted between the spring leaves.
As the leaves of a parabolic leaf spring assembly do not slide over each other, they are subjected to less friction than those of a trapezoidal leaf spring assembly. Consequently, they give a better ride under similar stiffness conditions.

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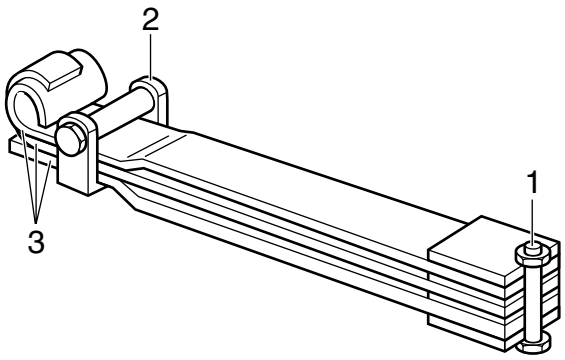
The spring leaves (3) of both types of assembly are held together by a centre bolt (1) and spring shackles (2).
The head of the centre bolt (1) is used to centre the spring assembly.
At the front, the spring assembly is connected to the spring bracket with a shackle pin.
At the rear, the spring assembly is "attached" to the spring bracket with either a shackle or a slipper seat, depending on the type of vehicle.
The spring assembly is clamped to the axle housing using U-bolts. A wedge and/or filler block may have been fitted between the spring assembly and the axle housing.
The U-bolts clamp the spring leaves together and secure the spring assembly to the axle. The forces on the axle are therefore passed on to the spring brackets via the spring assembly.



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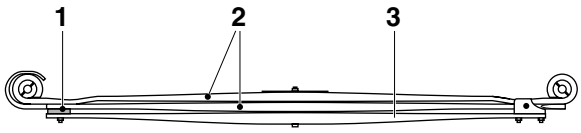
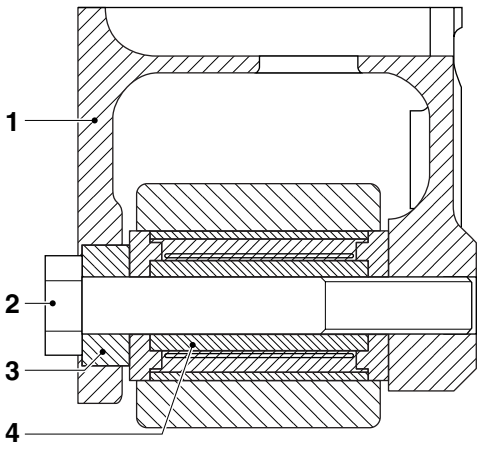
The parabolic spring assemblies applied in the case of a rear axle suspension are fitted with a helper leaf (3). A centre bolt is used to attach the helper leaf (3) to the other spring leaves (2). At the ends of the helper leaf (2) rubber blocks (1) are installed which rest against the main spring assembly.



C9 00 297

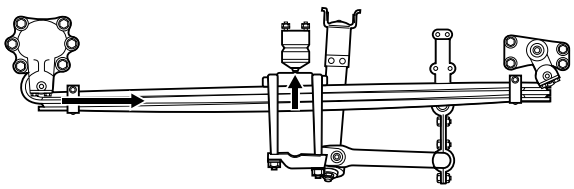
Except for the spring which comes with the air-sprung front axle suspension, the parabolic spring assemblies are fitted with a maintenance-free suspension.
To that end, a silentblock (4) is installed into the spring eyes. The silentblock is clamped in the spring bracket (1) using an attachment bolt (2) and sliding bush (3).

Apart from the spring function, the leaf spring assemblies also have the task of guiding the axle. This means that braking, driving and lateral forces are passed on to the chassis via the spring assembly and the front spring bracket.



C9 00 303

During fierce braking on a rough road surface, the leaf spring and the spring bracket have to deal with the forces of the weight of the vehicle (which is increased by driving over holes) and with the braking forces at the same time. This results in a considerable total force exerted on the leaf spring and the spring bracket.



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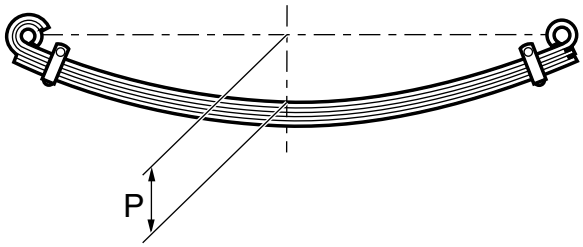
Spring opening

The spring opening (P in the drawing) indicates the deflection of the spring.
The spring assembly is constructed to obtain the optimum spring opening for a laden vehicle. If possible, check the spring opening on both sides of an evenly laden vehicle.
As a result of tolerances in the manufacturing process, it is possible that the spring openings differ from each other when the springs are unloaded, but are equal when the springs are loaded.
When spring assemblies are new, the difference in spring opening is small. As a result of settling of the spring assembly, the difference in spring opening may increase.
When the springs are loaded they become longer and the axle will move backwards. If the left and right spring openings of one axle differ too much, the result will be misalignment of both the vehicle and the axle.



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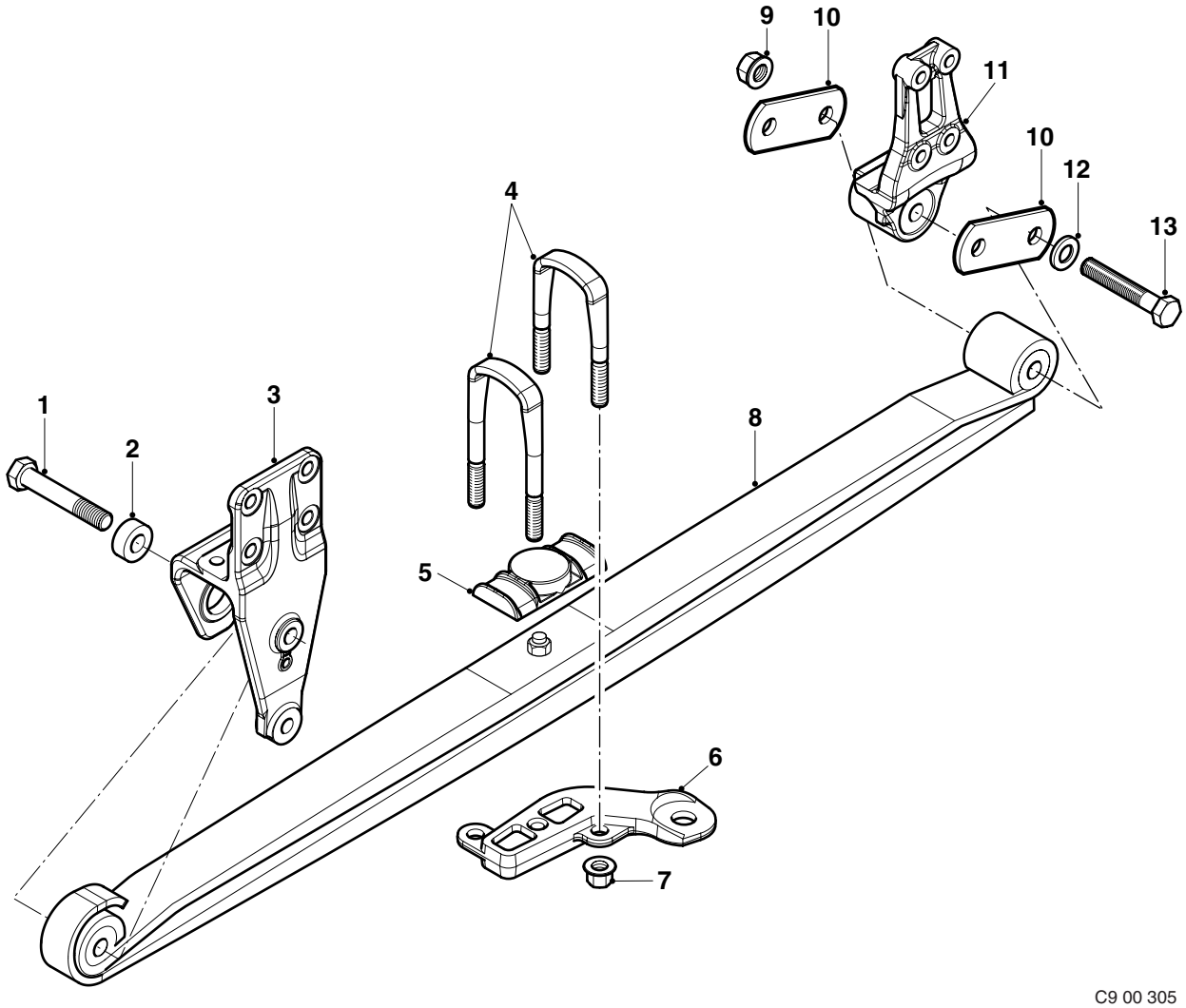
2.2 OVERVIEW DRAWING, SINGLE-AXLE SUSPENSION WITH BOLT ATTACHMENT

Note:
This drawing gives a general view and may differ from the actual situation on the vehicle.

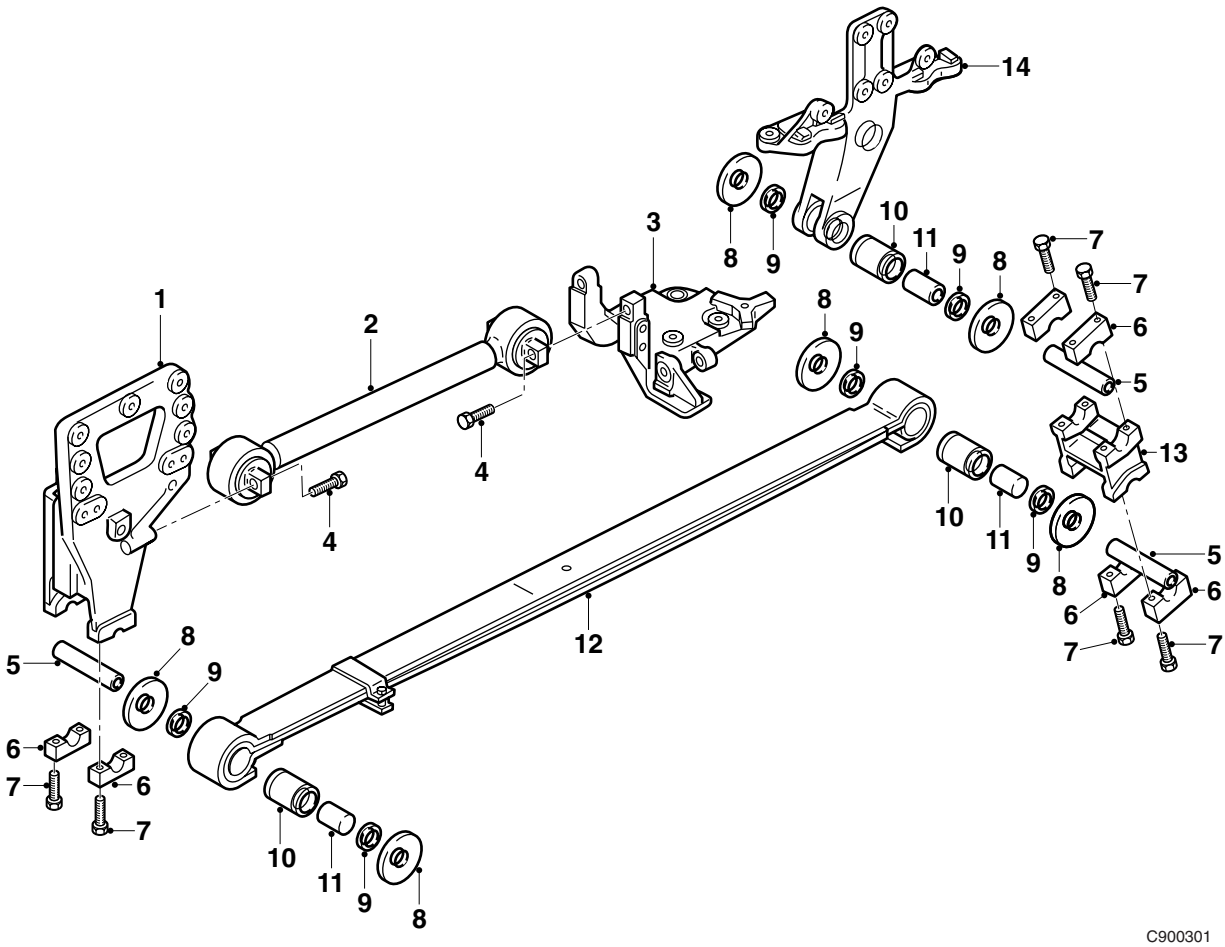


C9 00 305

1. Attachment bolt
2. Slide bush
3. Spring bracket
4. U-bolt
5. Upper spring seat
6. Shock absorber bracket
7. U-bolt nut
8. Spring assembly
9. Attachment nut
10. Shackle seat
11. Spring bracket
12. Sealing ring
13. Attachment bolt

2.3 OVERVIEW DRAWING, SINGLE-AXLE SUSPENSION WITH PIN ATTACHMENT

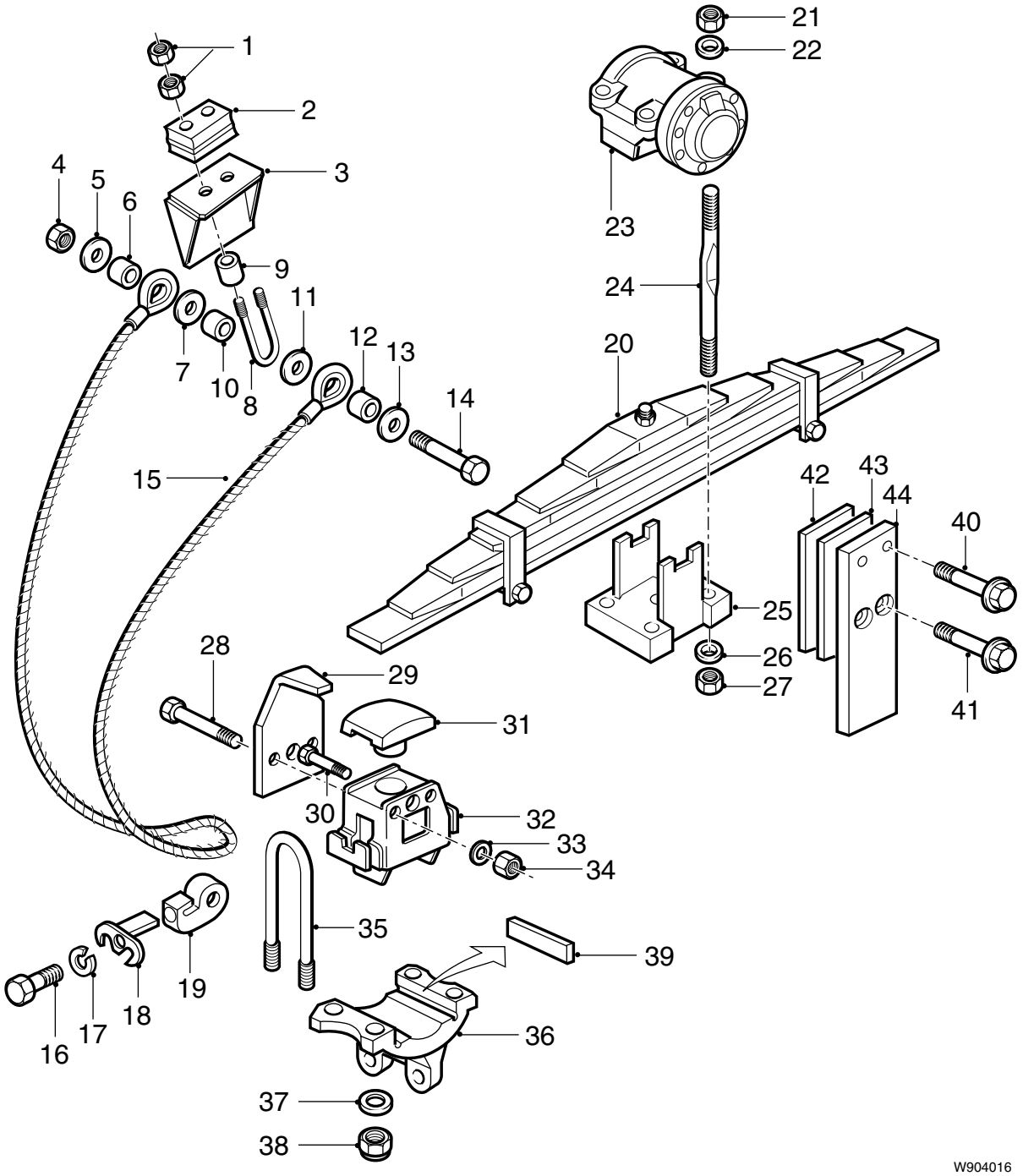
Note:
The spring suspension with pin attachment is a feature of the spring leaf of the air-sprung front axle suspension.
This drawing gives a general view and may differ from the actual situation on the vehicle.



1. Spring bracket
2. Torque rod
3. Torque rod bracket
4. Attachment bolt
5. Shackle pin
6. Locking plate
7. Attachment bolt
8. Ring
9. Sealing ring
10. Shackle bush
11. Bearing bush
12. Leaf spring
13. Spring shackle
14. Spring bracket

2.4 OVERVIEW DRAWING, TANDEM AXLE SUSPENSION

Note:
The tandem axle suspension may have a trapezoidal or parabolic leaf spring assembly. The trapezoidal leaf spring assembly is shown in the drawing. Neither an arresting cable nor an alignment plate is used for the parabolic leaf spring assembly.



1. Attachment nut
2. Stop block
3. Bracket
4. Attachment nut
5. Ring
6. Bush
7. Ring
8. U-bolt
9. Bush
10. Bush
11. Ring
12. Bush
13. Ring
14. Attachment bolt
15. Arresting cable
16. Attachment bolt
17. Ring
18. Bracket
19. Attachment block
20. Spring assembly
21. Attachment nut
22. Ring
23. Bearing support
24. Pull rod
25. Lower spring seat
26. Ring
27. Attachment nut
28. Attachment bolt
29. Plate
30. Attachment bolt
31. Wearing plate
32. Bracket
33. Ring
34. Attachment nut
35. U-bolt
36. Bracket
37. Ring
38. Attachment nut
39. Shim
40. Attachment bolt
41. Attachment bolt
42. Plate
43. Shim
44. Alignment plate

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3. REMOVAL AND INSTALLATION

3.1 REMOVAL AND INSTALLATION, SINGLE-AXLE SPRING ASSEMBLY WITH BOLT ATTACHMENT

Support the vehicle securely and work safely. Make sure that the axle cannot tip if both spring assemblies are removed at the same time.

Removing single-axle spring assembly with bolt attachment

1. Remove all components which are in the way when removing the attachment bolts.
2. Remove the U-bolt nuts.
3. Loosen the spring assembly attachment bolts.
4. Jack up the chassis until the spring assembly is free of stress.
5. Mark the position of the bolt heads. Remove the attachment bolts.
6. Jack up the chassis until the spring assembly is released from the spring bracket.
7. Make sure that the spring assembly cannot tip after the U-bolts have been removed.
8. Remove the U-bolts.
9. Mark the position of any wedge (if present).
10. Remove the spring assembly in a safe manner. This can only be done by two persons working together.

Installing single-axle spring assembly with bolt attachment

1. Check that all contact faces are free of dirt, grease and paint. Tighten the centre bolt and the spring clamp attachment bolts.

2. If applicable, fit the wedge in the correct position.

3. Install the spring assembly on the spring plate. This can only be done by two persons working together. Make sure that the centre bolt fits into the centring hole.

4. When reusing the U-bolts, check for corrosion and damage. Replace them if necessary. If they are to be reused, thoroughly clean the thread and remove any paint.
   If hexagonal U-bolt nuts are used, fit a hardened steel ring under the U-bolt nut.

5. Fit the U-bolts and hand-tighten the U-bolt nuts.

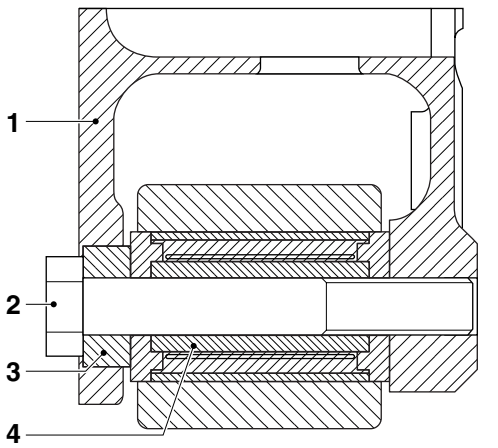
6. Lower the chassis or raise the axle such that the attachment bolts (2) can be installed. If necessary, push the sliding bush (3) back a bit. Fit the attachment bolts (2) and hand-tighten these.

7. Lower the chassis. Tighten the U-bolt nuts evenly to the specified tightening torque, see "Technical data".

8. Apply grease to the threaded ends of the U-bolts.

9. Tighten the attachment bolts (2) to the specified torque. See "Technical data".

10. Fit all removed parts, if applicable.



C9 00 303

3.2 REMOVAL AND INSTALLATION, SPRING ASSEMBLY SILENTBLOCK WITH BOLT ATTACHMENT

Removing spring assembly silentblock with bolt attachment

1. Remove the spring assembly from the vehicle.

2. Press the silentblock out of the spring eye of the spring assembly.

3. Check the spring eye for damage. If necessary, replace the entire spring assembly.

   Note:
   To ensure a secure adhesive joint, it is important that the bonding surface does not display any severe scoring.

Installing spring assembly silentblock with bolt attachment

1. Roughen the inside of the spring eye with Scotch Brite Very Fine and acetone until the surface is clean.

2. Thoroughly clean the inside of the spring eye hole with a piece of clean, lint-free cloth.

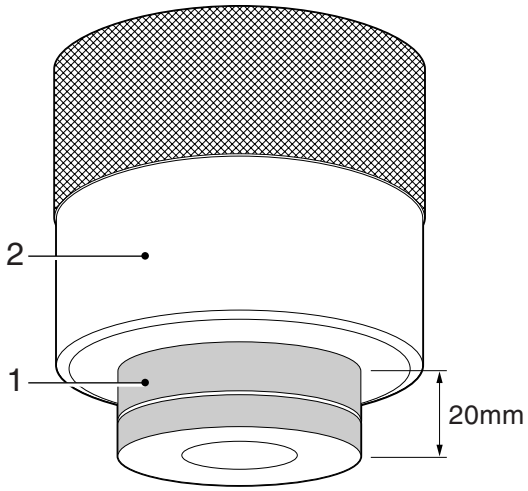
   Note:
   Make sure the work environment is clean.

3. Degrease the inside of the spring eye and the exterior of the silentblock using a clean lint-free cloth and Loctite cleaner 7063 and allow the surface to dry for at least 5 minutes. Apply the cleaner to the components again and allow the cleaner to completely evaporate.

4. Degrease the inside of the special tool (DAF no. 1453159) into which the silentblock will be squeezed using a clean lint-free cloth and Loctite cleaner 7063 and allow the surface to dry for at least 5 minutes.

   Note:
   To ensure that the adhesive joint is secure, it is very important that any grease and paint is completely removed from the components.

5. Press the silentblock (1) into the special tool (DAF no. 1453159) (2) until the rim of the silentblock projects about 20 mm below the special tool.



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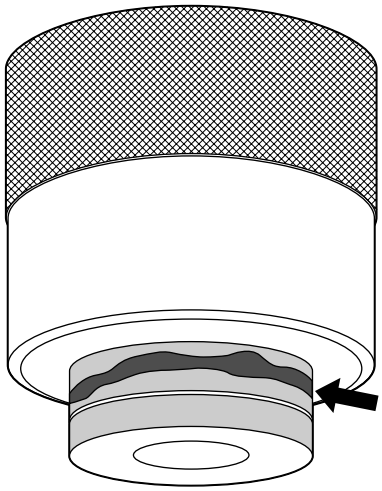
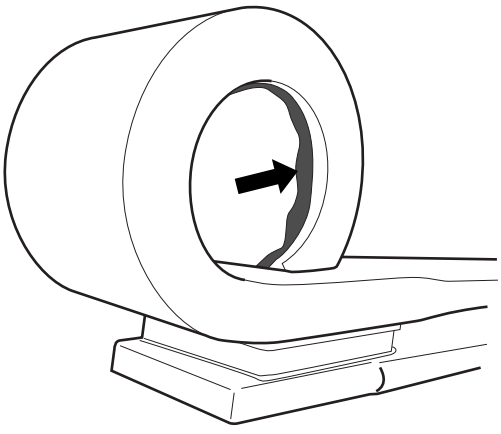
6. Apply a bead of Loctite 2701 around the rim of the silentblock where it projects below the special tool (DAF no. 1453159).



C9 00 522

7. Apply a bead of Loctite 2701 around the inside of the spring eye on the side into which the silentblock will be inserted.

   Note:
   The silentblock must be inserted in the spring assembly within 10 minutes, because of the setting time of the sealant.



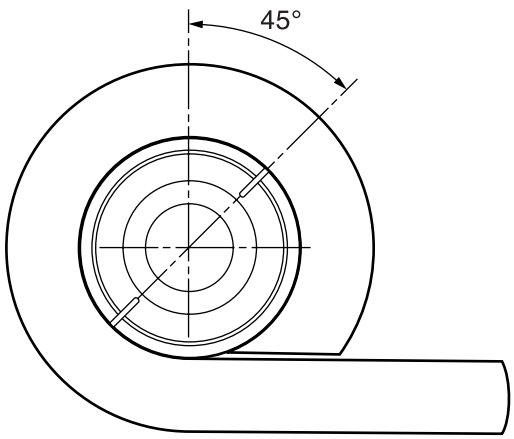
C9 00 521

8. Use the special tool (DAF no. 1453159) to press the silentblock into the spring eye in one move so that the partial seams of the silentblock are at an angle of 45°. Press the silentblock into the spring eye until it is in the same position on both sides.

9. Allow the adhesive joint to harden for **at least** 3 hours.

10. Fit the spring assembly to the vehicle.

    Note:
    The adhesive joint will have hardened after 24 hours. The vehicle may be driven once this time period has elapsed.



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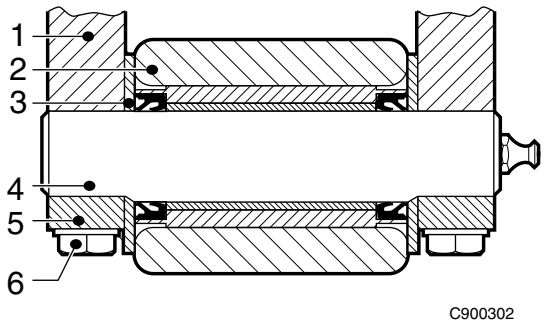
3.3 REMOVAL AND INSTALLATION, SINGLE-AXLE SPRING ASSEMBLY WITH PIN ATTACHMENT

Support the vehicle securely and work safely. Make sure that the axle cannot tip if both spring assemblies are removed at the same time.

Removing single-axle spring assembly

1. Remove the U-bolt nuts.
2. Jack up the chassis until the spring assembly is free of stress.
3. Remove the lock bolts (6) and lock plates (5) from the spring bracket and spring shackle.
4. Put a mark to indicate on which side of the shackle pins (4) the lubricating nipples are fitted.
5. Jack up the chassis so as to release the shackle pins (4).
6. Remove the rings (3) from the shackle pins (4). Remove the shackle pins (4) from the spring assembly (2).
7. Make sure that the spring assembly cannot tip after the U-bolts have been removed.
8. Remove the U-bolts.
9. Mark the position of any wedge (if present).
10. Remove the spring assembly in a safe manner. This can only be done by two persons working together.



Installing single-axle spring assembly

1. Clean and check the sealing rings, shackle pins and bearing bushes. Replace them if necessary.
   Check that all contact faces are free of dirt, grease and paint. Tighten the centre bolt and the spring clamp attachment bolts.
2. If applicable, fit the wedge in the correct position.
3. Install the spring assembly on the spring plate. This can only be done by two persons working together. Make sure that the centre bolt fits properly into the centring hole.

4. When reusing the U-bolts, check for corrosion and damage. Replace them if necessary. If they are to be reused, thoroughly clean the thread and remove any paint.
   If hexagonal U-bolt nuts are used, fit a hardened steel ring under the U-bolt.

5. Fit the U-bolts and hand-tighten the U-bolt nuts.

6. Apply lubrication grease to the shackle pins, bearing bushes and sealing rings.

7. Fit the shackle pins in the correct position (lubricating nipples on the correct side). Avoid damaging the sealing rings.

8. Fit a ring (3) on either side of the spring (2).

9. Lower the chassis or raise the axle until the shackle pin (4) just touches the spring bracket (1), but can still be rotated. Then rotate the shackle pin (4) until its flat side is parallel with the bottom of the spring bracket.

10. Secure the lock plates (5) with the locking bolts (6). The lock plates (5) should rest against the flat side of the shackle pin (4).

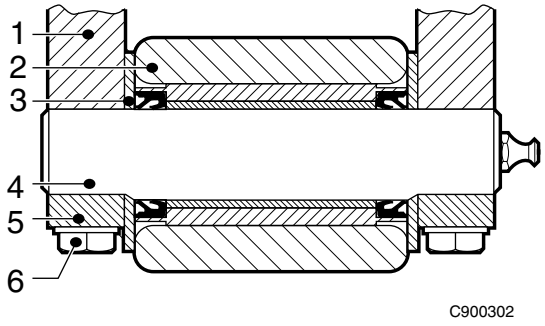
11. Tighten lock bolts (6) evenly on both sides of the spring (1), until the shackle pin (4) fits properly in the spring bracket (1).

12. Check again that the flat side of the shackle pin (4) is parallel with the bottom of the spring bracket (1). Tighten the lock bolts (6) to the specified torque. See "Technical data".

13. Thoroughly lubricate the shackle pins while the springs are in unloaded condition.

14. Lower the chassis. Tighten the U-bolt nuts evenly to the specified tightening torque, see "Technical data".

15. Apply grease to the threaded ends of the U-bolts.



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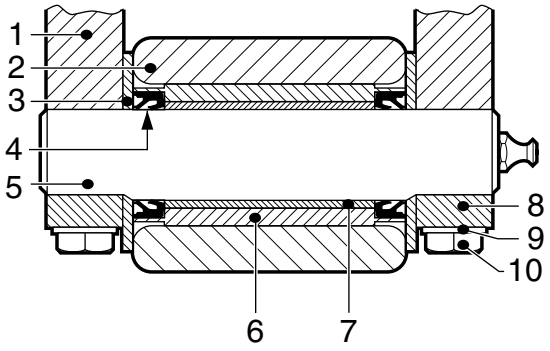
3.4 REMOVAL AND INSTALLATION, SEALING RINGS OF PIN ATTACHMENT

Removing sealing rings of pin attachment

1. Remove the spring from the spring bracket.
2. Remove the rings (3) from the shackle pin (5) and remove the shackle pin (5) from the spring (2).
3. Carefully remove the sealing rings (4) from the shackle bush (6) using, for example, a screwdriver.

Installing sealing rings of pin attachment

1. Install the sealing rings (4) with their open side at the outside (see the drawing). Grease the lips of the sealing rings.
2. Install the spring.
3. Thoroughly lubricate the shackle pins while the springs are in unloaded condition.



W9 04 012

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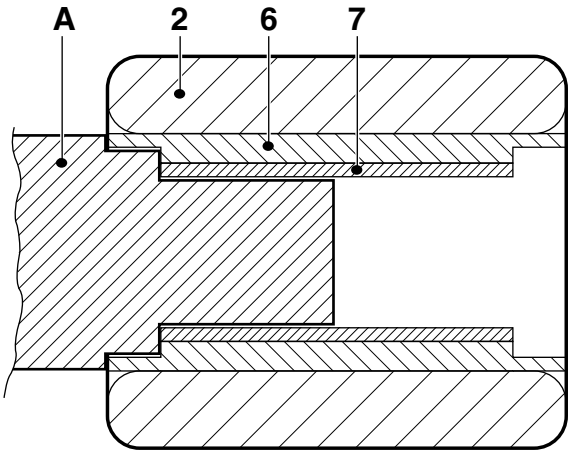
3.5 REMOVAL AND INSTALLATION, SHACKLE BUSH OF PIN ATTACHMENT

Removing shackle bush of pin attachment

1. Remove the spring from the spring bracket.
2. Remove the shackle pin from the spring.
3. Remove the sealing rings from the shackle bush.
4. If there is sufficient space under the vehicle, remove the shackle bush (6) with the bearing bush (7) from the spring eye (2) using driver (A), special tool (DAF no. 0694949). The spring assembly will have to be removed from the vehicle if either the shackle bush (6) is fitted too tightly in the spring eye (2), or if there is insufficient space under the vehicle. Use a pressing tool to remove the shackle bush (6) from the spring assembly.



C9 00 160

Installing shackle bush of pin attachment

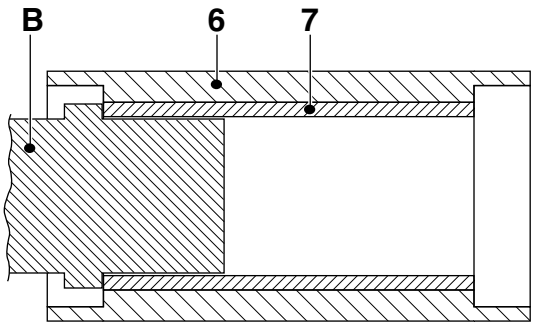
1. Tap or drive the shackle bush (6) with the bearing bush (7) into the spring eye using driver (A), special tool (DAF no. 0694949).
2. Fit new sealing rings.
3. Install the spring.
4. Thoroughly lubricate the shackle pins while the springs are in unloaded condition.

5

3.6 REMOVAL AND INSTALLATION, BEARING BUSH OF PIN ATTACHMENT

Removing bearing bush of pin attachment

1. Remove the spring from the spring bracket.
2. Remove the shackle pin from the spring.
3. Remove the sealing rings from the shackle bush (6).
4. Remove the shackle bush (6) with the bearing bush (7) from the spring eye.
5. Drive the bearing bush (7) from the shackle bush (6) using driver (B), special tool (DAF no. 0694948).



C9 00 159

Installing bearing bush of pin attachment

1. Drive a new bearing bush (7) into the shackle bush (6) using driver (B), special tool (DAF no. 0694948). The bearing bush (7) should be driven into the shackle bush (6) to the correct depth; see the drawing.
2. Fit the shackle bush into the spring eye.
3. Fit new sealing rings.
4. Install the spring.
5. Thoroughly lubricate the shackle pins while the springs are in unloaded condition.

3.7 REMOVAL AND INSTALLATION, SPRING BRACKET

Removing spring bracket

1. Jack up the chassis until the spring assembly is free of stress.

2. Remove the spring attachment.

3. Jack up the chassis further until the spring assembly has been released from the spring bracket.

4. Note the position of the attachment bolts (in view of the difference in lengths). Remove the attachment bolts. Remove the spring bracket from the chassis.

Installing spring bracket

1. Install the spring bracket in the same position as before it was removed. Place the spring bracket on the spring bracket outline on the chassis.

2. Check the contact surfaces of spring bracket, chassis and stiffening plates. These should be absolutely free from dirt and grease.

3. Fit the attachment bolts in the correct position and the correct location.

4. Tighten the spring bracket attachment bolts to the specified tightening torque, see "Technical data" for different versions.

5. Install the spring assembly.

3.8 REMOVAL AND INSTALLATION, SPRING BRACKET SILENTBLOCK

Note:
This description only applies to spring brackets that are used on spring assemblies with a bolt attachment.

Removing spring bracket silentblock

1. Take the spring bracket off the vehicle.

2. Press the silentblock out of the spring bracket.

3. Inspect the hole of the spring bracket for damage. If necessary, replace the spring bracket.

   Note:
   To ensure a secure adhesive joint, it is important that the bonding surface does not display any severe scoring.

Installing spring bracket silentblock

1. Roughen the hole of the spring bracket with Scotch Brite Very Fine and acetone until the surface is clean.

2. Thoroughly clean the hole of the spring bracket with a piece of clean, lint-free cloth.

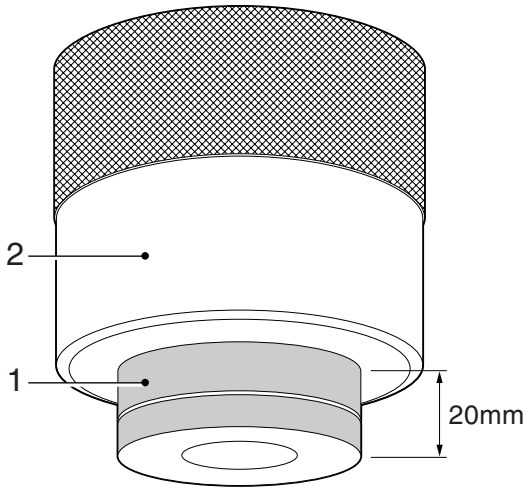
   Note:
   Make sure the work environment is clean.

3. Degrease the hole of the spring bracket and the exterior of the silentblock using a clean lint-free cloth and Loctite cleaner 7063 and allow the surface to dry for at least 5 minutes. Apply the cleaner to the components again and allow the cleaner to completely evaporate.

4. Degrease the inside of the special tool (DAF no. 1453159) into which the silentblock will be squeezed using a clean lint-free cloth and Loctite cleaner 7063 and allow the surface to dry for at least 5 minutes.

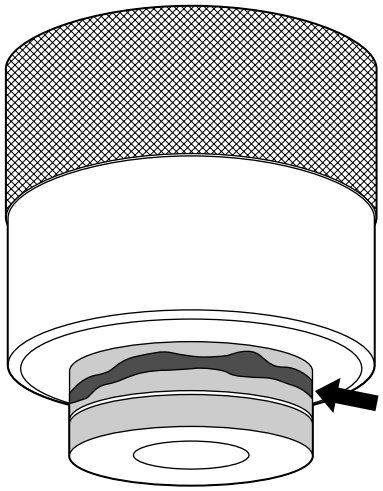
   Note:
   To ensure that the adhesive joint is secure, it is very important that any grease and paint is completely removed from the components.

5. Press the silentblock (1) into the special tool (DAF no. 1453159) (2) until the rim of the silentblock projects about 20 mm below the special tool.



C9 00 520

6. Apply a bead of Loctite 2701 around the rim of the silentblock where it projects below the special tool (DAF no. 1453159).



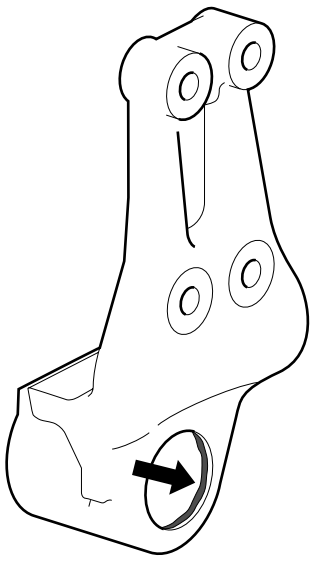
C9 00 522

7. Apply a bead of Loctite 2701 around the hole of the spring bracket on the side into which the silentblock will be inserted.

   Note:
   The silentblock must be inserted in the spring bracket within 10 minutes, because of the setting time of the sealant.

8. Press the silentblock into the spring bracket hole in one move using the special tool (DAF no. 1453159). Press the silentblock into the spring bracket hole until it is in the same position on both sides.

   Note:
   The mounting position of the silentblock in the spring bracket hole is not important.



C9 00 524

9. Allow the adhesive joint to harden for **at least** 3 hours.

10. Fit the spring bracket to the vehicle.

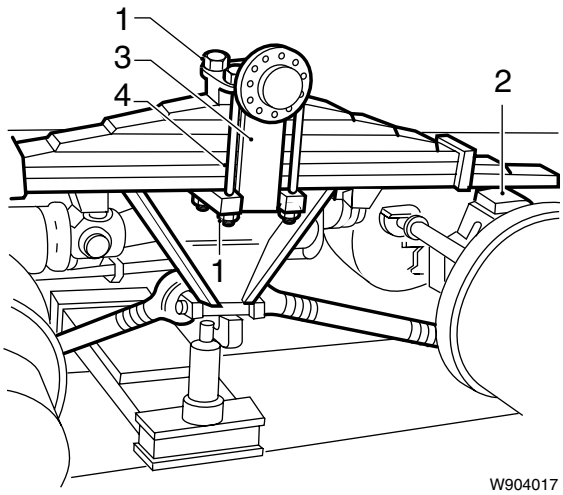
    Note:
    The adhesive joint will have hardened after 24 hours. The vehicle may be driven once this time period has elapsed.

3.9 REMOVAL AND INSTALLATION, TANDEM AXLE SPRING ASSEMBLY

Support the vehicle securely and work safely.

Removing tandem axle spring assembly

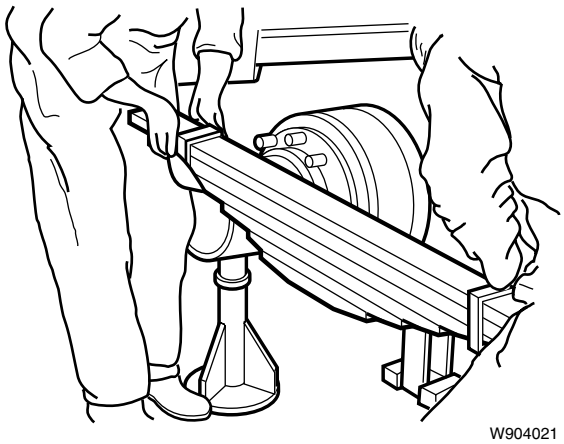
1. Support both axles and remove the wheels.
2. Jack up the chassis under the central suspension.
3. Loosen the nuts (1) of the tie rods (4) until the centre bolt comes off the pivot pin shackle.
4. Lower the chassis until the spring assembly rests on wearing plates (2).
5. Remove the tie rods (4) and the bottom spring plate (3). The spring assembly is now ready to be taken off.



W904017

Before the spring assembly of a trapezoidal leaf spring assembly is taken off, it must be turned upside-down. If this is not done, the spring assembly will tip over when being removed.

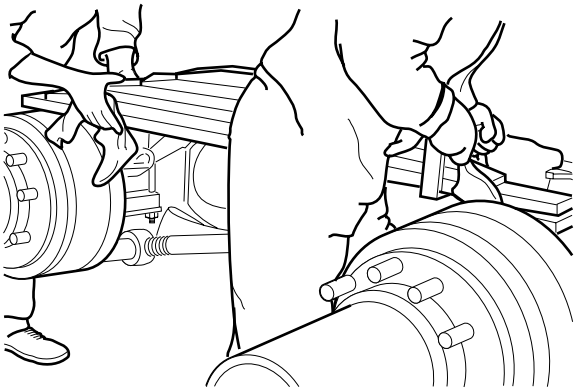
6. Turn the spring assembly of a trapezoidal leaf spring assembly upside-down. Remove the spring assembly.


W904021

Installing tandem axle spring assembly

1. Put the spring assembly on the brake drums. Turn the spring assembly of a trapezoidal leaf spring assembly right side up again, so that the short side is on top.

2. Put the spring assembly side by side on the wearing plates. This will prevent the trapezoidal leaf spring assembly from tipping over.


W904023

3. Fit the tie rods (4) and the spring plate (3). When tightening, check that the centre bolt head is located in the recess of the bearing support and that the alignment plates fit onto the cams of the bearing support.

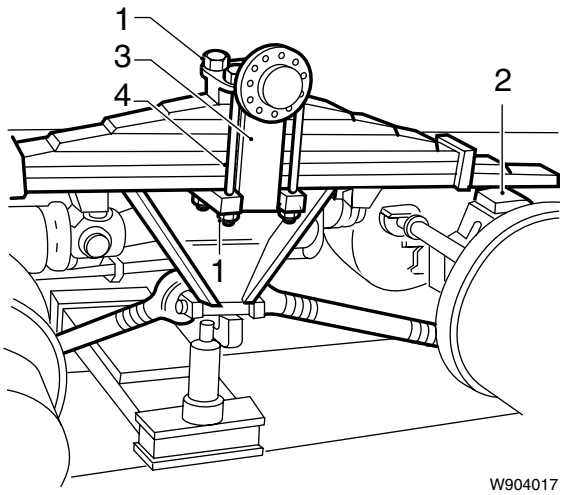
4. Lower the chassis.

5. Tighten the tie rods (4) to the specified torque. See "Technical data".
Make sure that the attachment nuts fully engage the tie rod.

6. Apply grease to the threaded ends of the tie rods sticking out above the attachment nuts.

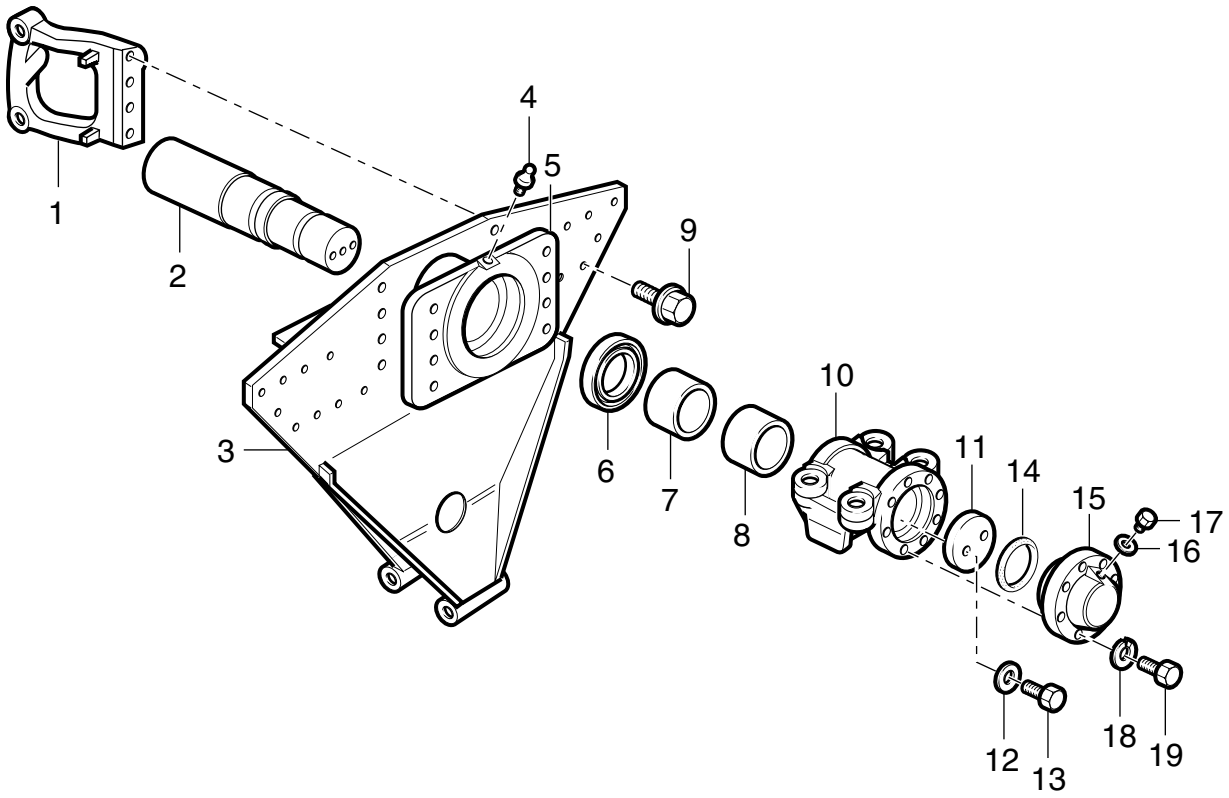
7. Put the wheels back on.

8. Re-torque the tie rod nuts after 2,500 km.



W904017

3.10 REMOVAL AND INSTALLATION, PIVOT PIN



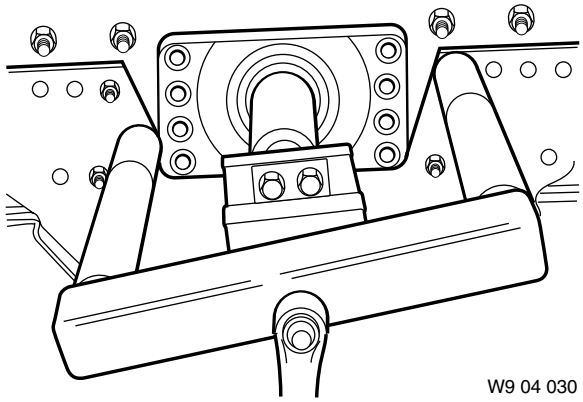
W9 04 025

Removing pivot pin

1. Remove the spring assembly.
2. Remove the pivot pin cover (15) and collect the oil.
3. Remove the O-ring (14).
4. Remove the two attachment bolts (13) from the locking plate (11).
5. Remove the locking plate (11).
6. Take bearing support (10) off the pivot pin (2).
7. Take the oil seal (6) out of the bearing support (10).
8. Remove the bearing bushes (7) and (8) from the bearing support (10), using a suitable driver.

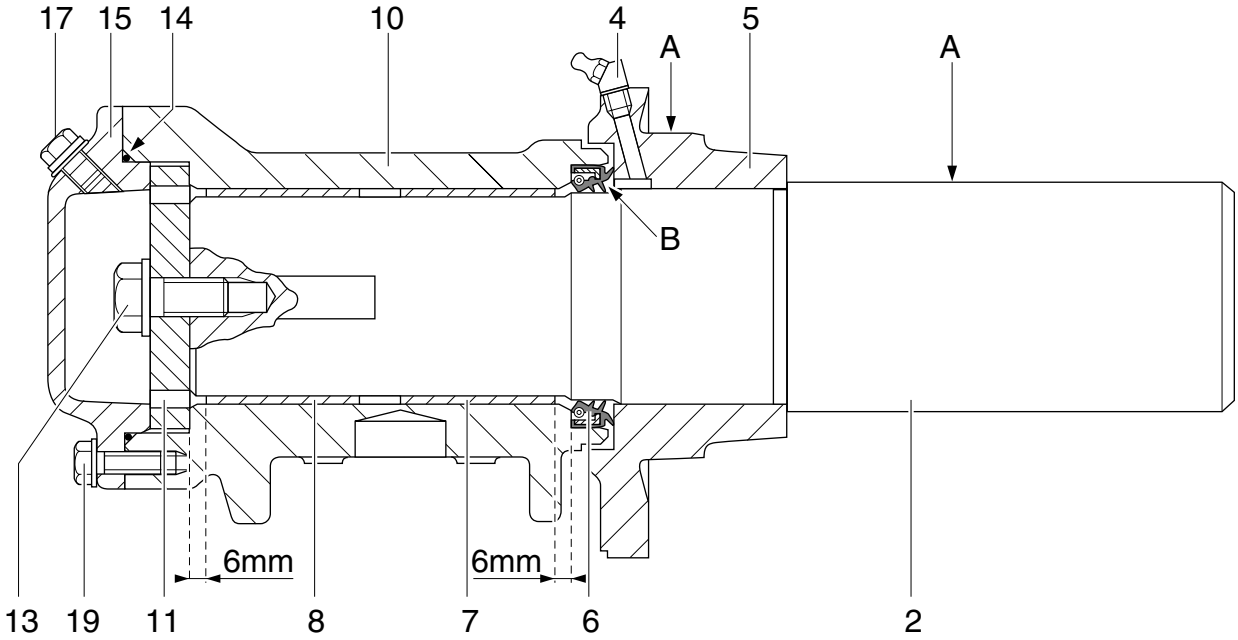
9. Remove the attachment bolts (9) from the pivot pin flange (5) and use a puller to pull the pivot pin flange together with the pivot pin (2) out of the chassis.

10. Drive the pivot pin (2) out of the pivot pin flange (5).



W9 04 030

Installing pivot pin



W9 04 035

1. Check the oil seal chamber in the bearing support for damage.
   Check the contact face of the oil seal on the pivot pin for damage.

2. Drive the pivot pin (2) out of the pivot pin flange (5).

3. Apply a thin layer of grease to surfaces (A) of pivot pin (2) and the pivot pin flange (5) and reinstall them in the chassis.

4. Fit the attachment bolts of the pivot pin flange crosswise and tighten them to the specified tightening torque, see "Technical data".

5. Drive the new bearing bushes (7) and (8) to the correct depth in bearing support (10), using a suitable driver.

6. Use a suitable driver to fit a new oil seal (6) in bearing support (10), with the open side facing the bearing bushes. When driving, avoid damaging the outer oil seal lip.

7. Apply grease to the outside surface of the oil seal (6), area B in the drawing.

8. Apply oil to the bearing bushes (7) and (8) and fit bearing support (10) onto the pivot pin. Avoid damaging the oil seal.

9. Apply locking compound to the attachment bolts (13), see "Technical data". Fit the locking plate (11). Tighten the attachment bolts (13) to the specified torque. See "Technical data".

10. Fit the cover (15), using a new O-ring (14).

11. Fill the pivot pin with the specified oil.

12. Lubricate the space between the bearing support (10) and the pivot pin flange (5) with grease through the lubricating nipple. A collar of grease should be visible around the bearing support.

3.11 REMOVAL AND INSTALLATION, ARRESTING CABLE AND BUMP STOP

Removing arresting cable

1. Remove the attachment bolt (16) and the locking plate (18).

2. Loosen the attachment nuts (1) a little if necessary and remove the attachment bolt (14). Remove the arresting cable.

Installing arresting cable

1. Fit the arresting cable to bump stop (2), using attachment bolt (14). Tighten the attachment bolt (14) to the specified torque. See "Technical data".

2. Check if the washers (5), (7), (11) and (13) just touch the bracket (3). If not, tighten the attachment nuts (1) until the rings just touch the bracket (3).

3. Make sure that the cable length is divided in two equal ends and fit the attachment bolt (16) with locking plate (18). The difference in length between the two cable ends should not be more than 2 mm.

4. Grease the entire arresting cable.

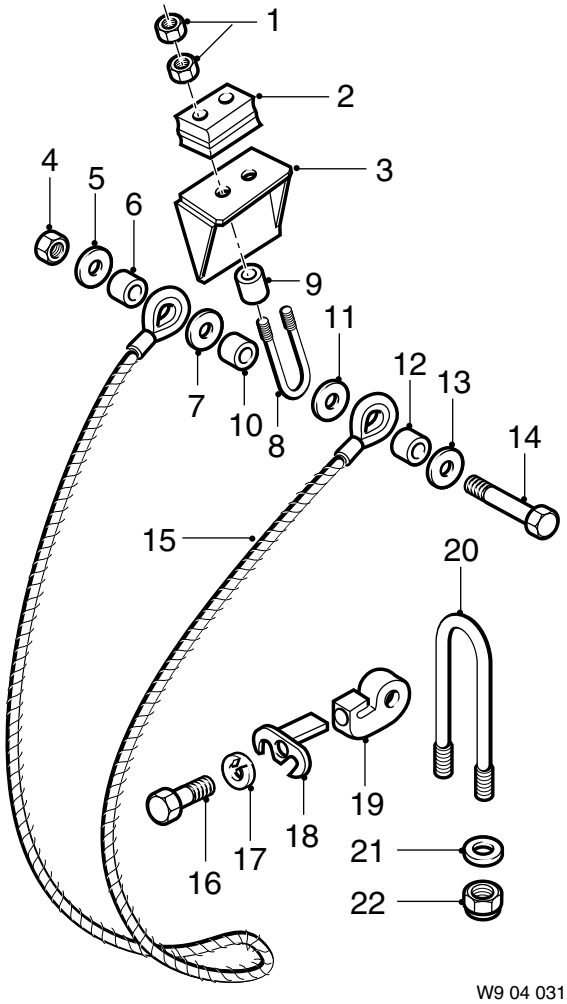
Removing bump stop

1. Remove the four attachment nuts (1) and remove bump stop (2).

Installing bump stop

1. Fit the bump stop (2).

2. Tighten the attachment nuts (1) until the washers (5), (7), (11) and (13) just touch the bracket (3).



W9 04 031

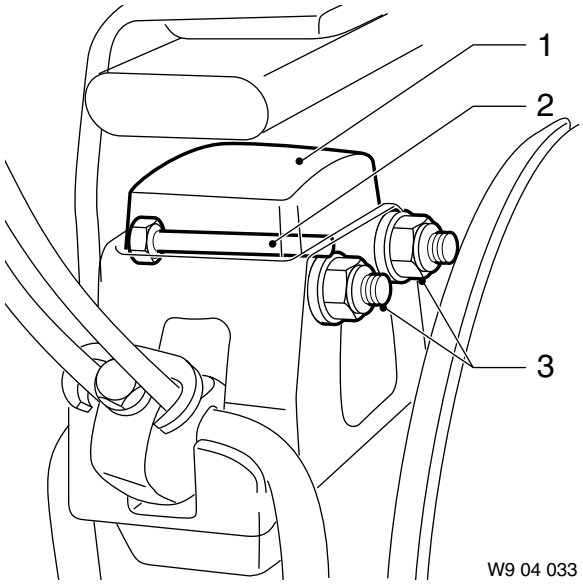
3.12 REMOVAL AND INSTALLATION, WEARING PLATES

Removing wearing plates

1. Jack up the vehicle until the spring assembly ends are not resting on the wearing plates any more.
2. Support the vehicle securely with stands or blocks under the chassis side members.
3. Remove the two attachment bolts (3) and take off the catch hook.
4. Remove the locking bolt (2) - which lies loose in the bracket - and lift wearing plate (1) off the bracket.

Installing wearing plates

1. Check the minimum wearing plate dimensions, see "Technical data".
2. Put the wearing plate (1) on the bracket.
3. Fit the locking bolt (2) which lies loose in the bracket (1).
4. Install the two attachment bolts (3) with the catch hook.
5. Remove the bracket.



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3.13 REMOVAL AND INSTALLATION, ALIGNMENT PLATES

Removing alignment plates

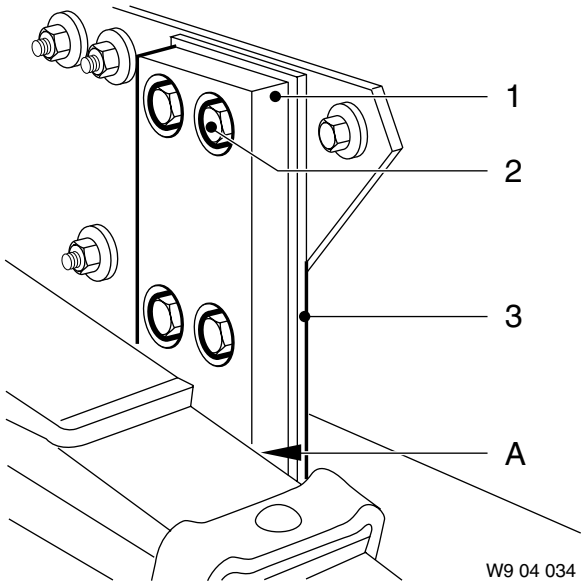
1. Remove the attachment bolts (2) and remove the alignment plate (1).

Installing alignment plates

1. The clearance (A) between the spring assembly and the alignment plate can be filled with filler plates (3) or by replacing the alignment plate, depending on the condition of the alignment plate.

2. Check the clearance after installing a new alignment plate, see "Technical data". Adjust the clearance required.

3. Tighten the attachment bolts (2) to the specified torque. See "Technical data".



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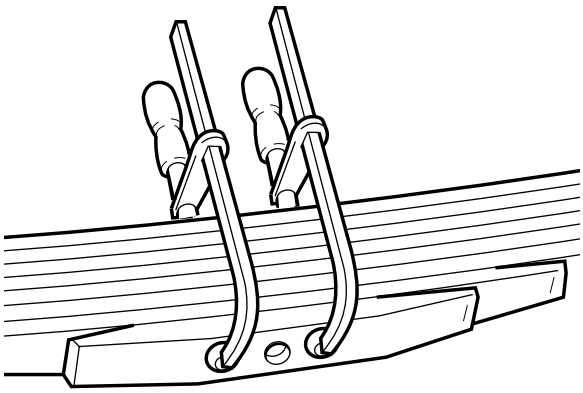
4. DISASSEMBLY AND ASSEMBLY

4.1 DISASSEMBLY AND ASSEMBLY, SPRING ASSEMBLY

Note:
Replacing only the broken spring leaf is not recommended. All spring leaves in the assembly were pre-settled together, to enable an even load distribution across all spring leaves.
A new spring leaf will not have been pre-settled and therefore does not carry an equal part (usually a larger part).
If the spring leaf fracture was the result of ageing or overloading, it is recommended to replace the leaf spring assemblies on both sides. Otherwise, the difference in spring opening between the two sides could become too large, which would result in misalignment of both the vehicle and the axle.
Renewal of parabolic spring leaves is strongly advised against. Renewal is only allowed if the supplier of the single spring leaf also is the supplier of the spring assembly.

Disassembling spring assembly

1. Disassemble the spring assembly.
2. Clamp the spring assembly in such a way, e.g. using two screw clamps, that it will stay together when the centre bolt is removed (avoid damage).
3. Remove the clamping bolt from both spring shackles.
4. Remove the centre bolt. Note the position of the centre bolt.
5. Carefully release the pressure on the assembly.
6. Take the spring assembly apart.



W9 04 006

Assembling spring assembly

1. Neighbouring spring leaves should also be replaced if they are damaged. This means a complete assembly for a three-leaf parabolic spring assembly. Check the other spring leaves for damage. Replace these, if necessary.
2. Remove all rust from the remaining spring leaves and treat them with zinc primer.
3. Check the centre bolt for damage.
4. Put together the spring assembly. The centre bolt should not have any play in relation to the spring assembly.
5. Fit the centre bolt in the correct position and tighten it.
6. Fit the attachment bolts of the spring clamps.

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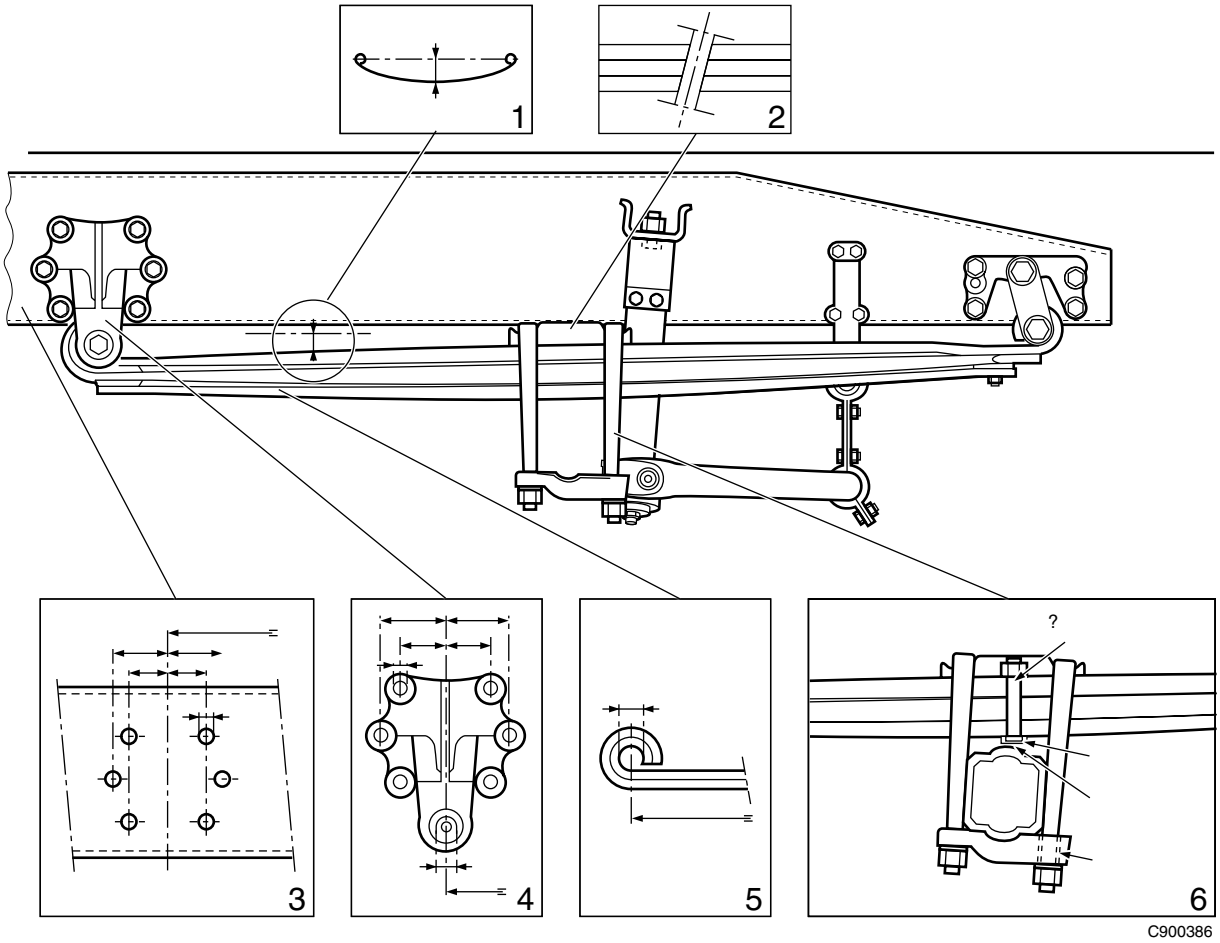
1. GENERAL

1.1 DESCRIPTION OF POSSIBLE CAUSES OF REAR AXLE MISALIGNMENT



The drawing above shows several factors which determine the position of the axle under the vehicle:

1. Difference in spring opening between the spring assemblies on the left and right as a result of the composition of the spring assemblies, or of an unbalanced vehicle load.
2. Play between the centre bolt and the spring assembly.
3. Location of the holes in the chassis for the attachment of the spring bracket.
4. Dimensions of the spring bracket.
5. Dimensions of the spring eye.
6. Installation of spring assembly to the axle housing.

Points 2 to 6 are factors determined by the manufacturer. Generally, the manufacturer will ensure that the axle is (within a narrow margin) positioned at an angle of 90° in relation to the central axis of the chassis.
Point 1, however, cannot always be controlled by the manufacturer.
The difference in spring opening, which is minimal for new spring assemblies, may increase as a result of the "settling" of the spring assembly. Furthermore, the superstructure and vehicle load may be the cause of a difference in spring opening and, consequently, misalignment of the axle.
During spring movement the axle moves backwards. If the springs on one side deflect more than on the other side because of an unbalanced vehicle or superstructure, this side of the axle will move further backwards than the other. As a result, the axle will no longer be at right angles to the centreline of the vehicle.

The misalignment of the rear axle(s) may result in increased tyre wear.
In case of a combination (truck and trailer or a tractor and semi-trailer), a misaligned trailer or semi-trailer may cause increased tyre wear on the drawing vehicle.

2. INSPECTION AND ADJUSTMENT

2.1 INSPECTION AND ADJUSTMENT, AXLE ALIGNMENT

General

- Use only high-quality testing tools for measurements. They must be calibrated regularly and preferably be of the type that can be calibrated before every use.
- Position the vehicle on a flat and level surface during the measurement.
- Work with great accuracy.
- Check the position of each wheel relative to the centreline of the vehicle (twin wheels are regarded as one wheel).
- The misalignment of a rear axle is equal to the average of the individual misalignments of the left and right rear wheels.
- For a vehicle combination (truck with trailer, or tractor with semi-trailer), the alignment of the vehicle combination as a whole must be checked. A misaligned trailer or semi-trailer may cause problems for the tractor.

Inspection of axle alignment

1. Make sure that the load being carried is representative of normal vehicle operation. The load must be at least 40% of the permissible loading weight and be evenly distributed over the vehicle.

2. Drive the vehicle straight to the test location to avoid stresses in the chassis or in the axle suspension system.

   Note:
   Avoid braking hard and do not put the vehicle on the parking brake.

3. Check the tyre pressure prior to the measurement. Adjust if necessary.

4. Check the spring opening of the spring assembly and check the axle suspension for play. Any defects should be repaired first.

5. Consult the measuring tool instructions for use and adhere to them.

6. Calibrate the testing tool, if possible.

7. Use the testing tool to measure the position of each rear axle wheel in relation to the vehicle centreline in mm/m.

8. Determine the position of the rear axle relative to the vehicle centreline, on the basis of the positions of the two wheels.

9. Check that the outcome is within the permitted tolerance limits. If the misalignment of the axle is beyond this limit, the axle alignment needs to be adjusted.

10. If two or more rear axles are fitted, check the position (non-parallelism) of the rear axles to each other.

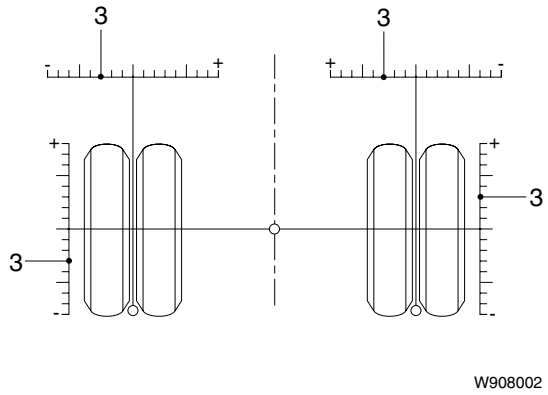
11. Check that the outcome is within the permitted tolerance limits. If the misalignment (non-parallelism) of the axle is beyond this limit, the axle alignment needs to be adjusted.

Determining the axle alignment
A practical aid to visualise the position of the axle is the test report at the end of this section.
Mark the test readings as shown below.

6

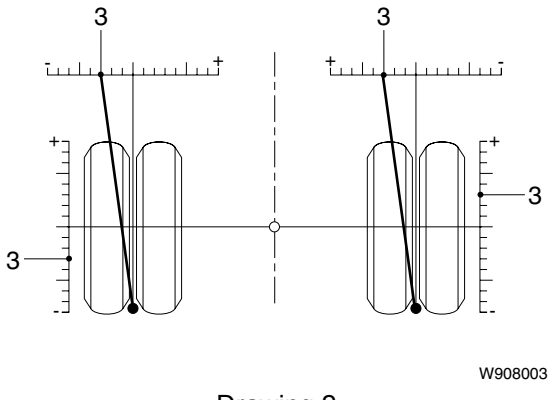
Example 1

1. Mark the test readings in the scales at the top and side of the measured wheel.
   In the opposite example (drawing 1) the misalignment has been determined as a 3 mm/m toe-out in relation to the vehicle centreline for the left wheel and a 3 mm/m toe-in in relation to the vehicle centreline for the right wheel.



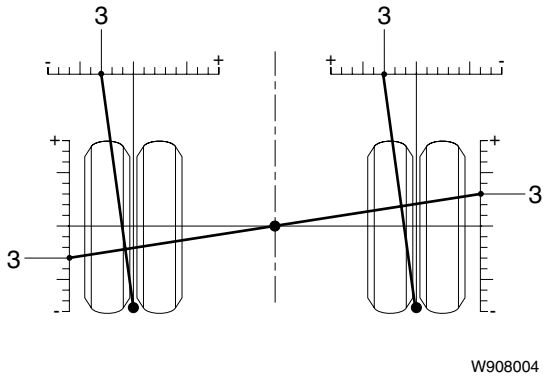
Drawing 1

2. From the small circle at the bottom of the wheel, draw a straight line to the test reading indicated on the wheel top scale. This should be done for both wheels (drawing 2).
   The (mis)alignment of the wheels relative to the vehicle centreline is now visible.



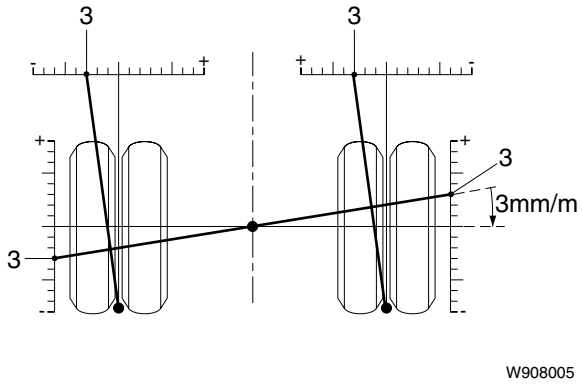
Drawing 2

3. From the small circle between the wheels (on the vehicle centreline), draw a straight line to the test reading scales at the side of the wheel. This should be done for both wheels (drawing 3).
The axle (mis)alignment relative to the vehicle centreline is now visible.



Drawing 3

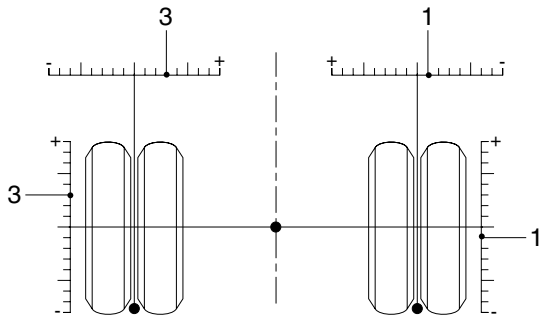
4. To realign the axle in this example, it would have to be rotated 3 mm/m to the right (drawing 4).



Drawing 4

Example 2

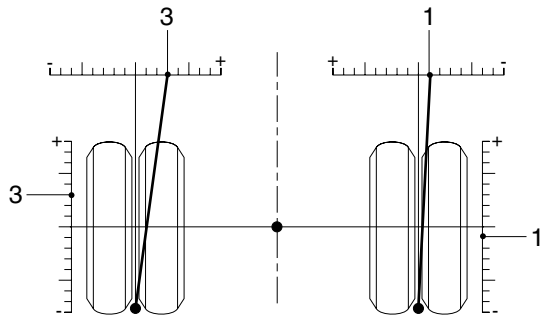
1. Mark the test readings in the scales at the top and side of the measured wheel. In the example (drawing 5) the misalignment has been determined as a 3 mm/m toe-in in relation to the vehicle centreline for the left wheel and a 1 mm/m toe-out in relation to the vehicle centreline for the right wheel.



W908006

Drawing 5

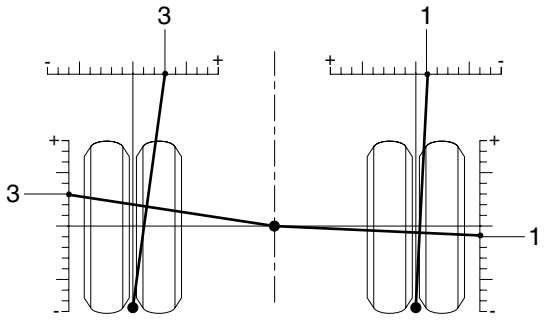
2. From the small circle at the bottom of the wheel, draw a straight line to the test reading indicated on the wheel top scale. This should be done for both wheels (drawing 6). The (mis)alignment of the wheels relative to the vehicle centreline is now visible.



W908007

Drawing 6

3. From the small circle between the wheels (on the vehicle centreline), draw a straight line to the test reading scales at the side of the wheel. This should be done for both wheels (drawing 7). The axle (mis)alignment relative to the vehicle centreline is now visible. From the figure it becomes apparent that this axle is not entirely straight. The wheels of this axle have a 2 mm/m toe-in relative to one another.

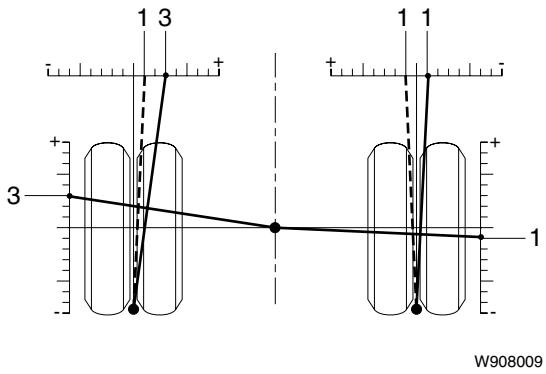


W908008

Drawing 7

4. Divide the total toe-in equally over the two wheels. The toe-in per wheel would be 1 mm/m. Mark these values on the top scales (drawing 8).

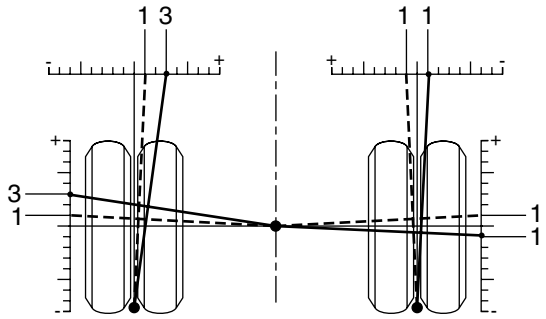
5. From the small circle at the bottom of the wheels, draw straight dotted lines to the 1 mm/m markings on the scales (drawing 8).



W908009

Drawing 8

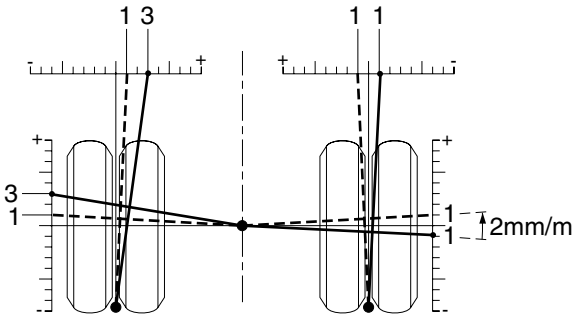
6. From the small circle between the wheels draw a straight dotted line to the 1 mm/m marking on the scale at the side of the wheel. This should be done for both wheels (drawing 9).
The ideal position of the axle is now made visible by the dotted lines (drawing 9).



W908010

Drawing 9

7. To realign the axle in this example, it would have to be rotated 2 mm/m to the left (drawing 10).



W908011

Drawing 10

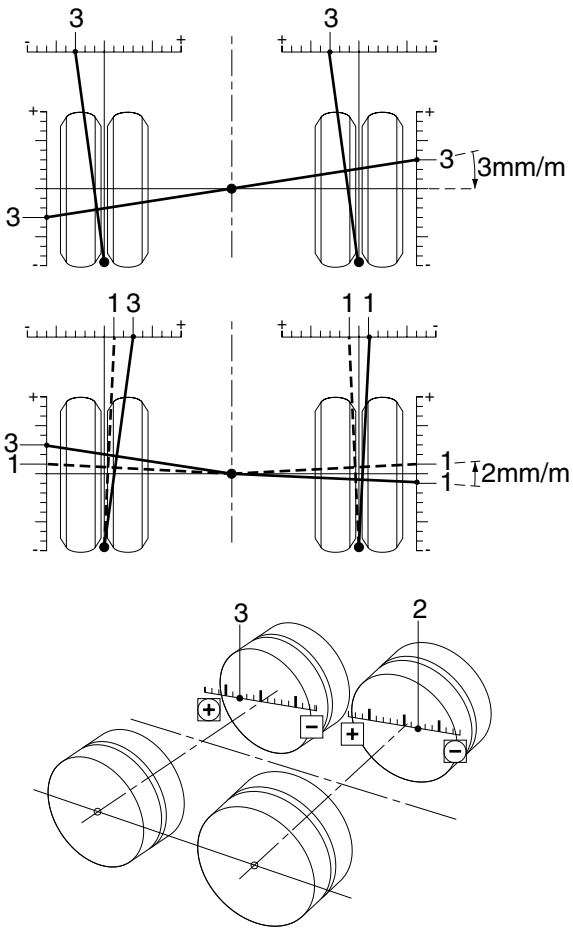
Example 3
This example refers to a vehicle with two rear axles.

1. The adjacent drawing shows the axles of the previous two examples. The positions of the two axles relative to the vehicle centreline have already been determined.

2. The necessary realignment value (in mm/m) for the two axles is also the misalignment value relative to the vehicle centreline. Enter these values in the scale of the figure at the bottom of drawing 11. Take care to enter this value on the correct side (+ or - side) of the vehicle centreline indicated in this drawing.

3. From the small circles in the centre of the left wheels, draw straight lines to the markings on the scale (drawing 12). The position of the two axles relative to each other is now visible. With this, it can be determined whether the axles need realigning, and which one needs realigning.
Any adjustment necessary can also be indicated as a dotted line in the figure.

   Note:
   Quite often, it is only necessary to realign one of the axles to get both axles positioned parallel to each other (within the permitted tolerance limits).

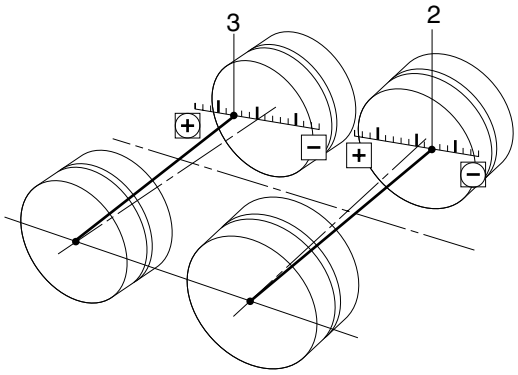


W908012

Drawing 11

4. The non-parallelism in this example is 5 mm/m. In this case, it is therefore sufficient to reposition only the front axle.

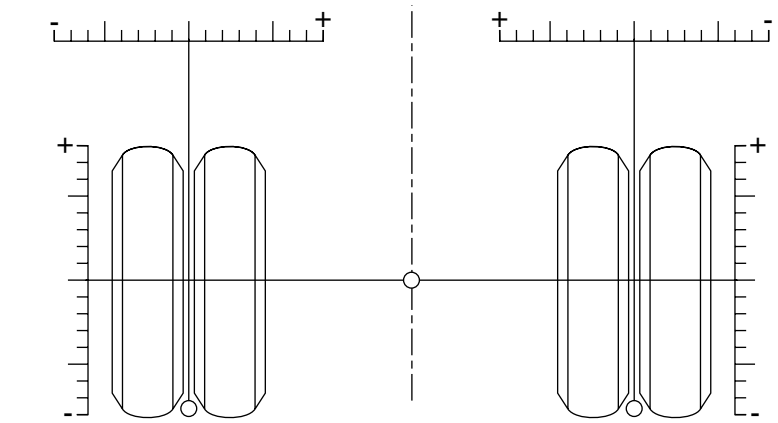
   Note:
   The method of repositioning the axle depends on the type of axle suspension.

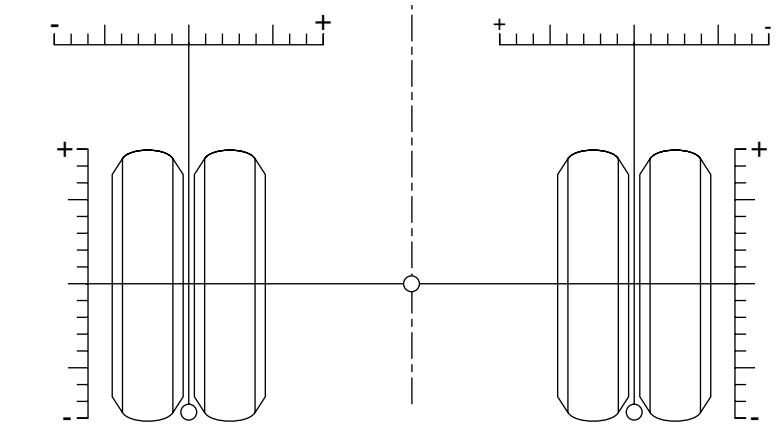


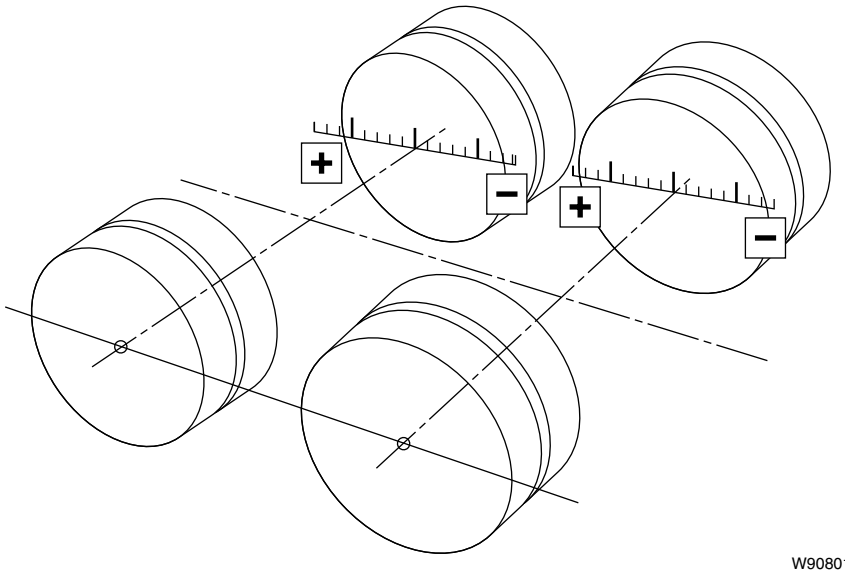
W908013

Drawing 12

Test report



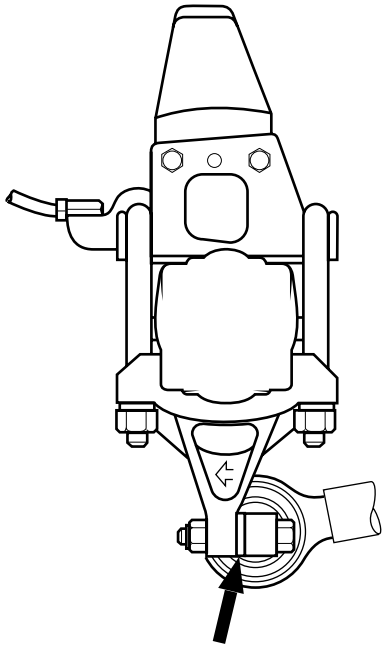




W908014

Correcting the misalignment of air-sprung axle(s) and tandem axle suspension

- The misalignment of the axle can be corrected by fitting a hardened steel ring (DAF no. 0202838) between the torque rod and the torque rod bracket. This ring is 3 mm thick. Grind the ring, if necessary. The application of more than one ring is not acceptable. The application of more than one ring would increase the risk of a loosening connection.
- The thickness of this shim in mm should be equal to the rear axle misalignment in mm/m.

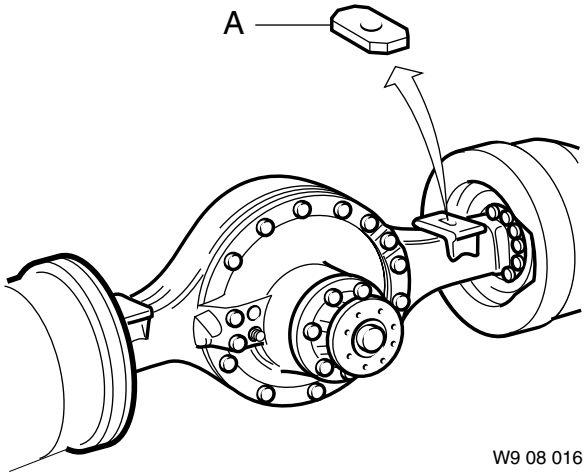


W9 08 015

Correcting the misalignment of a leaf-sprung trailing axle suspension

The driven axle can be repositioned to correct a misalignment (non-parallelism) between the driven axle and the trailing axle.

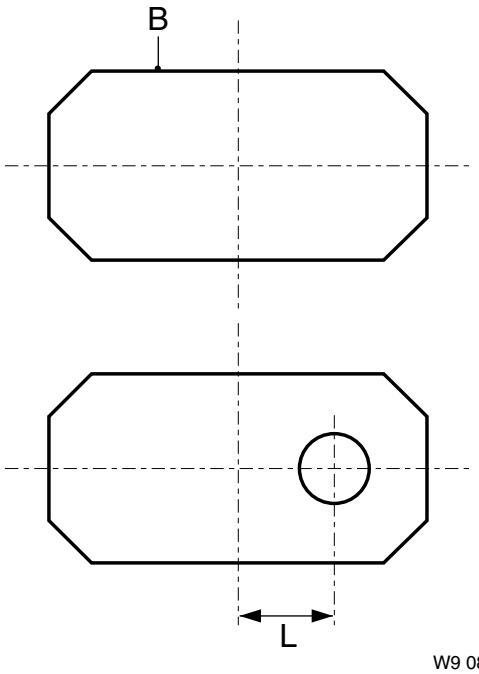
The alignment of the driven axle is determined by a metal block (A), which is placed in a recess of the axle seat.
This block contains a hole for the spring assembly centre bolt. Replacing this block with a block with the hole further to the front or the rear will cause the entire axle to shift forward or backward at that side.



W9 08 016

For this purpose blocks (B) without a hole can be ordered, (DAF no. 0893145).
The hole must be custom drilled in the correct position.

1. Have a block without a hole at hand.
2. Determine the misalignment of the driven axle relative to the trailing axle in mm/m.
3. The misalignment value is the distance between the centre of the hole to be drilled and the centre of the block (distance L in the adjacent drawing).
4. Very accurately drill a ∅ 17.5 mm hole in the block in the correct place. Check the distance.
5. Remove the nuts from the U-bolts.
6. Jack up the chassis until there is sufficient clearance between the spring assembly and the axle seat. Support the chassis in a safe way.
7. Remove the metal block which is now loose in the axle seat.
8. Place the new block in the axle seat, making sure that the position of the axle is adjusted in the right direction.
9. Install the U-bolt nuts and tighten them to the specified tightening torque, see "Technical data".



W9 08 017

Correcting the misalignment of a leaf-sprung axle suspension

A leaf-sprung suspension can only be corrected to a very limited degree.
The only possible correction is using the available play between the spring bracket and the chassis.

1. Loosen the spring bracket attachment bolts and slide the spring bracket as far as possible in the desired direction.

2. If this is insufficient, the spring bracket on the opposite side of the chassis can be moved in the opposite direction.

3. Make sure that the contact surfaces between spring bracket/chassis are absolutely free from paint, grease and dirt. Tighten the spring bracket attachment bolts to the specified torque. See "Technical data".

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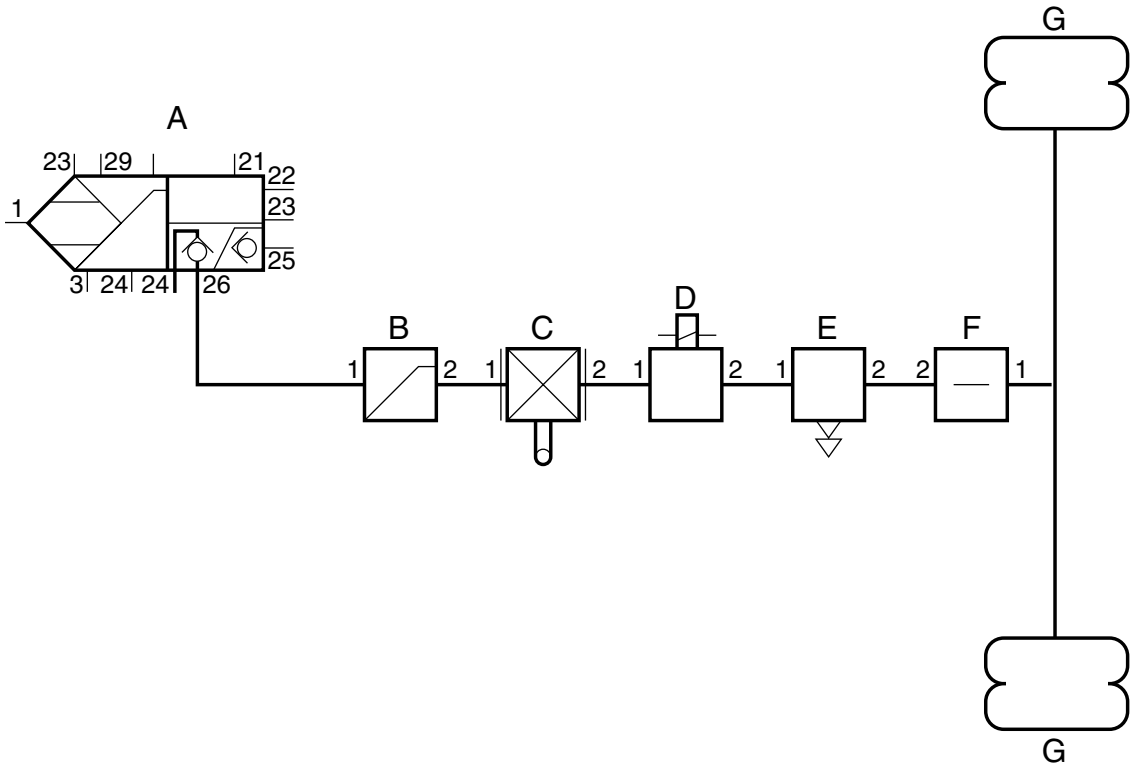
1. GENERAL

1.1 SYSTEM DESCRIPTION, LEAF-SPRUNG DRIVEN AXLE WITH AIR-SPRUNG LEADING REAR AXLE

Circuit diagram



C9 00 437

A. Air supply unit
B. Pressure-limiting valve
C. Load-sensing height-control valve
D. Electropneumatic valve
E. Quick-release valve
F. Pressure-relief valve
G. Air bellows

Principle of leading rear axle air suspension
The air required for the air suspension is branched from the air supply unit (A) (circuit 4) of the air system.
The air flows from the air supply unit (A) to the pressure-limiting valve (B). The pressure-limiting valve (B) limits the air pressure to the load-sensing height-control valve (C) to 7 bar. The load-sensing height-control valve (C) responds to each change of distance between the driven axle and the chassis through a rod connected to the driven rear axle.

7

When the axle load on the driven axle increases, air is supplied to the air bellows (G) of the leading rear axle via the height-control valve (C).

When the axle load on the driven axle decreases, the bellows (G) are vented via the quick-release valve (E), resulting in the bellows pressure being reduced.
If the axle load of the leading rear axle increases, for example as a result of driving over a speed bump, then the bellows pressure will become higher than the pressure in the pipe for the quick-release valve (E). This results in the quick-release valve (E) bleeding, causing the axle load to decrease.

An electropneumatic valve (D) is fitted between the load-sensing height-control valve (C) and the quick-release valve (E). The pipe to the quick-release valve (E) can be bled using this valve, resulting in the quick-release valve (E) venting the bellows.
This results in the axle load of the driven axle being increased, meaning the traction of the driven axle is increased.
The electropneumatic valve (D) can be controlled from the cab.

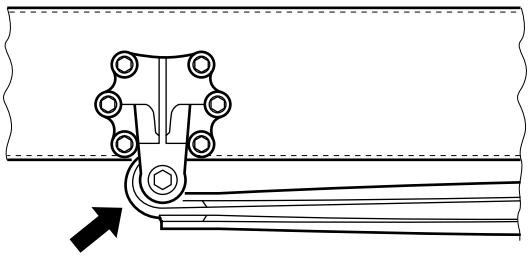
A pressure-relief valve (F) is also fitted between the quick-release valve (E) and the air bellows; this pressure-relief valve is set at 0.5 bar.
The valve is fitted between the pipe in such a manner that when the pipe is vented a residual pressure of 0.5 bar remains in the bellows. This residual pressure prevents "pleating" of the bellows.

Principle of axle load protection
There may be a safety mechanism to prevent overload of the driven axle. A proximity switch, controlled by the rod of the load-sensing height-control valve (C), monitors the axle load.
The proximity switch is activated when the maximum value is reached. A relay activates the electropneumatic valve (D) so that air is no longer exhausted from the bellows (G) but supplied to them. This reduces the axle load on the driven axle.

2. INSPECTION AND ADJUSTMENT

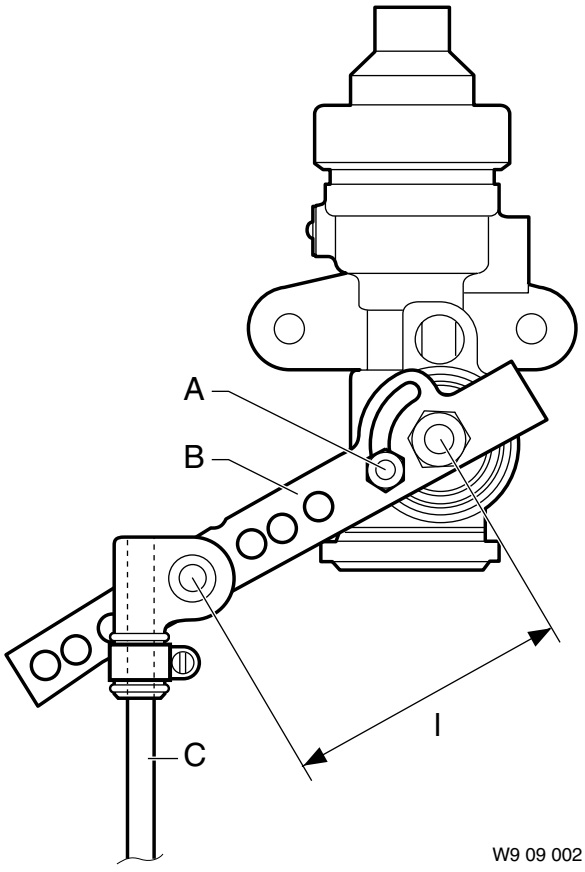
2.1 INSPECTION AND ADJUSTMENT, HEIGHT-CONTROL VALVE

1. Measure the joint axle load of the leading rear axle and the driven rear axle.
2. Check the DAF number of the rear axle leaf spring. The number is indicated on the front of the leaf spring.



C9 00 436

3. Look up the axle load ratio of the vehicle concerned. The axle load ratio is indicated on the vehicle identification plate, fitted on the left-hand side door post.
4. Check the adjustment of the pressure-limiting valve and adjust it if necessary.
5. Check whether the bolt (A) is located in the lower position of the slotted hole. Check whether the bolt (A) is well tightened
6. Measure the length l of the lever (B) and check the lever length on the basis of the value indicated in the table concerned, see "Technical data". Adjust the lever length, if necessary, to the length stated in the table.
7. Fit a T-piece fitted with a test connection in the pipe from the pressure-relief valve to the air bellows.
8. Connect a calibrated pressure gauge to the test connection.
9. Measure the bellows pressure. Look up in the correct table, see "Technical data', the relevant bellows pressure at the total axle pressure measured and compare it with the bellows pressure measured.
10. If the bellows pressure has to be adjusted, the connection rod (C) between the lever and the rear axle body must be extended or shortened. Extending increases the pressure and shortening decreases the pressure.



W9 09 002

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11. After adjusting, operate the height-control valve by hand by moving the lever (B) up and down.

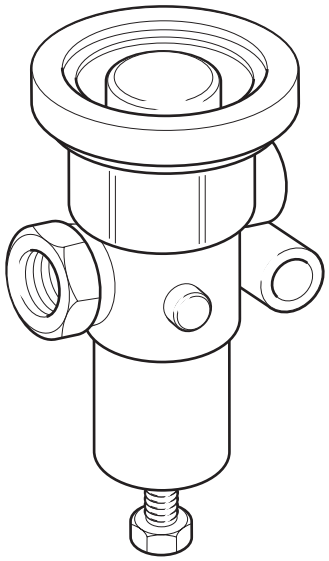
12. Let the height-control valve return to the initial position and check the bellows pressure once again. Repeat this procedure several times.

    Note:
    After the connection rod length has been adjusted, the axle load ratio of the steered leading rear axle and the driven axle changes will have changed in relation to one another. It is therefore necessary to check the setting of the ALR valve.

13. Check the setting of the pressure-relief valve.

2.2 INSPECTION AND ADJUSTMENT, PRESSURE-LIMITING VALVE

1. Connect a pressure gauge to the output pipe (pipe connection 2).
2. Increase and reduce the input pressure. The output pressure should immediately also rise and fall to under the set limiting pressure.
3. Enter the input pressure and check whether the limiting pressure corresponds with the value indicated. See "Technical data".
4. Adjust the valve by tightening or slackening the adjustment bolt. Tightening the adjusting bolt increases the pressure, slackening decreases the pressure.



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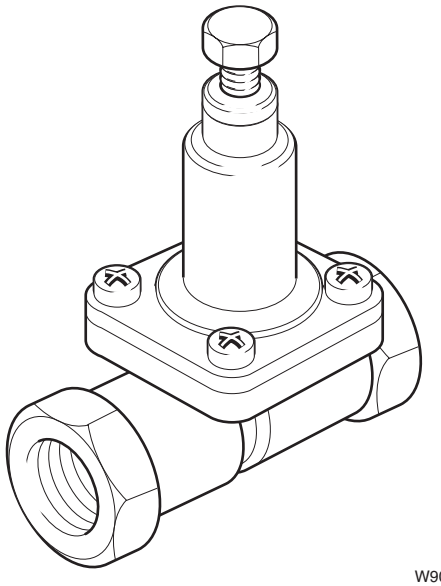
2.3 INSPECTION AND ADJUSTMENT, PRESSURE-RELIEF VALVE

1. Fit a T-piece fitted with a test connection in the pipe from the pressure-relief valve to the air bellows.
2. Connect a pressure gauge to the test connection.
3. Pressurise the bellows.
4. Switch on the electropneumatic valve, by which means the bellows are vented.
5. Check whether the residual pressure agrees with the value indicated, see "Technical data".
6. The residual pressure can be adjusted by tightening or slackening the adjustment bolt of the pressure-relief valve. Tightening the adjusting bolt increases the pressure, slackening decreases the pressure.

   Note:
   If the pressure-relief valve is replaced, make sure that when connecting the pressure-relief valve that it is connected in the correct manner. Pipe connection 2 is connected to the pipe from the electropneumatic valve and pipe connection 1 is connected to the pipe to the air bellows.



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